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FORENSIC PAVEMENT ANALYSIS

Final Report

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16. Abstract

This study proposed to use portable weigh-in-motion systems to collect sample truck data throughout the State of Arizona in lieu of standard loadometer testing. The primary purpose of data collection was to provide a large quantity of useful data for input into the pavement design process. It was also anticipated that the data would be helpful to state highway planners.

Originally, data were to be collected at thirty sites on the Arizona State Highway System. The sites were selected by knowledgeable Arizona Department of Transportation (ADOT) personnel in order to increase the probability of obtaining a representative sample of truck traffic on Arizona's highways.

Portable WIM Devices were evaluated for various applications and that evaluation is contained in this report.

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FORENSIC PAVEMENT ANALYSIS

INTRODUCTION

Despite an increase in maintenance activity and expenses on the Arizona state highway system over the past decade, the condition of the system continues to decline. In some locations, the pavement is deteriorating faster than its design life span.

There are many reasons for this deterioration. Rutting, for example, may be caused by a combination of factors, including bad weather (moisture), traffic conditions (e.g., heavy trucks), and several other variables.

While it may not be possible to calculate the impact of many of these factors, it is essential to the pavement design process to assess the extent of heavy vehicle traffic on the state system. Until now, the sole source of heavy vehicle load data has been from standard loadometer tests. These tests have been conducted every two years at 14 locations on the state system using a portable platform scale. Although it is desirable that the data be collected more frequently and at additional points along the system, the difficulty in using the portable scales and the accompanying risks to ADOT personnel restrict the scope of testing and confine the tests to daytime hours. It is likely, then, that the data collected during these tests are underestimates, as much of the heavier truck traffic is thought to occur at night. In addition, the communication of heavy vehicle drivers with one another may lead to avoidance of the test site by overweight vehicles, further adding to the systematic error in measurement.

In order to more accurately assess traffic mix, volumes, and loads on the system, it is clear that large amounts of data would need to be collected system-wide over full 24-hour periods. Preferably, the data would be collected using a less obtrusive means, so that systematic error could be avoided.

Weigh-In-Motion: The Alternative

Past studies have demonstrated the viability of weigh-in-motion (WIM) systems for traffic measurement (1,2). The suitability of these systems specifically for collecting highway design and planning data was explored by the State of Louisiana (3). In an 18-month long study, data were collected at two locations proximal to static scales operated by Louisiana Department of Transportation and Development.

Statistical analyses conducted on the data comparing static, weigh-in-motion, and portable scales generally found very high correlations between the different weighing methods. Although the portable and static scales differed least from each other, weigh-in-motion scales deviated only slightly more. The study concluded that WIM equipment could be used to supplement or replace loadometer study methods. Portable WIM systems were suggested for this purpose.

Thus, it appears that weigh-in-motion technology provides the tools necessary to accomplish the extensive data collection effort required for effective pavement design. With the use of WIM equipment and loop detectors, the number and classification of heavy vehicles, as well as their weight, can be assessed electronically. WIM equipment can provide all of the data which is currently being supplied by loadometer tests for input into the pavement design process. Portable weigh-in-motion systems have the added advantage of being able to be installed in a relatively short period of time, by a small crew, with minimal traffic interruption.

RESEARCH PURPOSE AND SCOPE

This study proposed to use portable weigh-in-motion systems to collect sample truck data throughout the State of Arizona in lieu of standard loadometer testing. The primary purpose of data collection was to provide a large quantity of useful data for input into the pavement design process. It was also anticipated that the data would be helpful to state highway planners.

Originally, data were to be collected at thirty sites on the Arizona State Highway System. The sites were selected by knowledgeable Arizona Department of Transportation (ADOT) personnel in order to increase the probability of obtaining a representative sample of truck traffic on Arizona's highways. The locations of the proposed sites are depicted in Figure 1.

As can be seen, the selected data collection points are primarily on Interstate routes, as these routes are known to carry the majority of the State's truck traffic. (Note that the site numbers do not carry any special significance -- they merely serve as identifiers.)

At each site, the plan was to install the WIM equipment in one lane in each direction of travel. The equipment would then be left to collect data for a full 24 hour period.

It was anticipated that the data could be collected and analyzed in a six-month time frame.

WEIGH IN MOTION SYSTEM DESCRIPTION

The weigh-in-motion systems used in this study were manufactured by Golden River; the mats were manufactured for Golden River by Electromatic in South Africa. The Model 381 systems which were utilized have 128K memory for data storage.

In a typical installation, the WIM system is either connected to existing speed loops embedded in the pavement or, if these are not available, to temporary loops affixed to the pavement with adhesive tape. (See diagram in Figure 2.) When a vehicle passes over the mat, its speed, classification, axle spacings, length, axle weights and gross weight are calculated and stored in memory with a unique id number and the time and date. Once retrieved, data are easily transferred to microcomputer for processing.

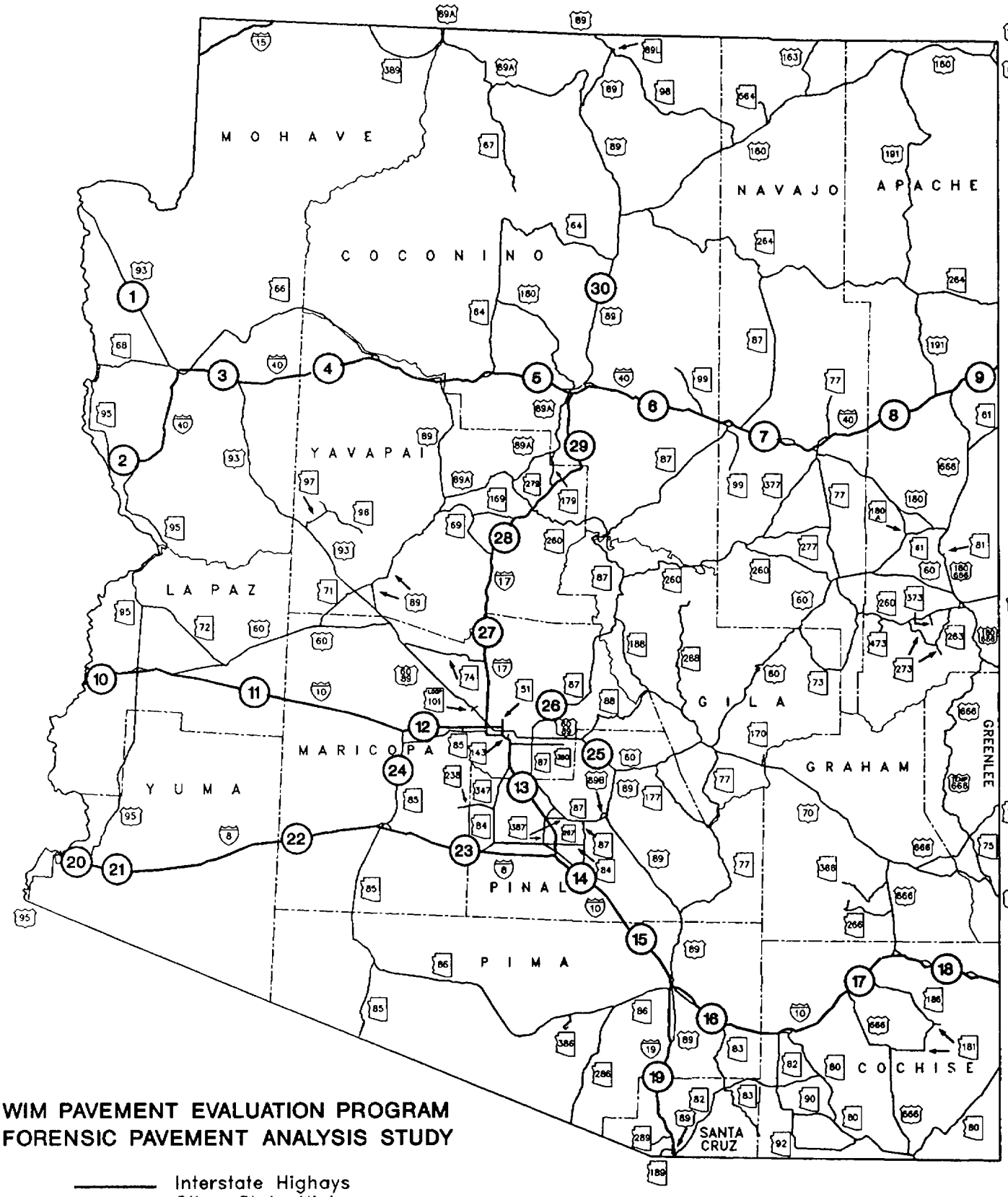


Figure 1. Locations of proposed sites for WIM data collection.

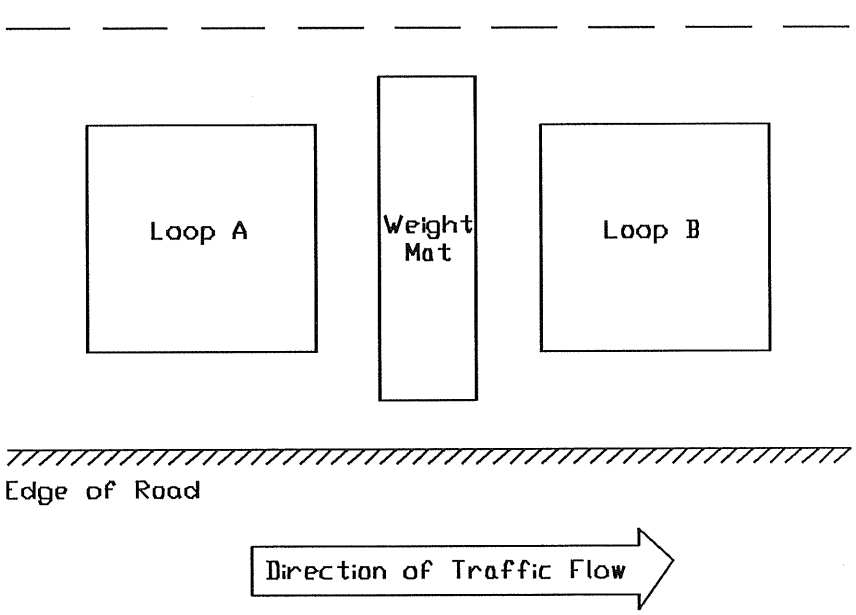


Figure 2. Diagram of weigh-in-motion installation.

TEST RESULTS

System Calibration and Pretesting

The weigh-in-motion mats are calibrated prior to shipment based on the results of factory tests. However, the preset correction factor usually requires adjustment once the WIM equipment is placed in the field in order to accommodate heavy vehicle traffic. Techniques for calibrating WIM systems vary considerably, as noted by Davies and Sommerville (4). The method used to calibrate the WIM equipment in this study is similar to the technique they described which is used by Idaho Department of Transportation:

> Essentially, it involved using a three-axle test vehicle of 30,000 lb. gross weight making a series of runs over the systems of 20, 40, and 60 mph. The system calibration was then adjusted to minimize the average differences between the dynamic and static gross weights (p. 123).

A variation of the "known weight" method was used in this study. Two trucks were used for calibration -- one two-axle and one three-axle. A minimum of ten runs were made over the WIM mats by each vehicle at a constant rate of speed.

It was discovered that one mat operated properly with the factory correction factor of 207. The second mat tested, which had a preset correction factor of 157, was calibrated to a correction factor of 132.

As is the case when using any measurement tool, it was deemed important to initially assess the accuracy of the Golden River weigh-in-motion systems. For that reason, a thorough test was conducted in order to assess the validity (accuracy compared to static weight) and reliability (accuracy compared to other WIM systems) of the WIM equipment used in this study.

The tests were conducted over two days in late September, 1988. Two sets of WIM equipment were installed side by side on the onramp to the weigh station at Topock

port-of-entry on westbound Interstate 40. Use of this station, which had been closed, allowed the testing to continue uninterrupted. Seventy-six trucks were weighed on both the WIM scales and the port's static scale. Trucks were identified at both sets of scales and a perfect data match was achieved.

Reliability Test

Gross weights measured by the two WIM scales were compared with a one-way analysis of variance in order to ascertain how different pieces of WIM equipment might vary when compared to each other. The mean gross weights (59103, 56369) did not differ significantly from each other, F(1,150) 1. Descriptive statistics are presented in Table 1.

It was concluded from these results that the two sets of WIM equipment could be used interchangeably, and that the data collected using these two WIM systems could be compared without further qualification.

Validity Test

Because the WIM gross weights were found not to differ significantly from each other, the overall mean for both sets of data was used for comparison with mean static weight. It was noticed that 20 of the WIM weights varied more than 20% from their static counterparts. The majority of these unacceptable weights (16) were observed from the downstream mat. Even so, the mean gross weight for wim and static scales (57736, 59565) were not significantly different from each other, F(1,226) 1. Descriptive statistics are presented in Table 2.

It was concluded from these results that the two WIM systems had been calibrated in an acceptable fashion. Thus, the correction factors derived by the "known weight" method and used during validity testing were retained for the balance of the study.

Table 1. Descriptive statistics for two weigh-in-motion systems.

Group	Mean Gross Wt	Standard Deviation	Standard Error	95 Percent Confidence Interval for Mean
WIM 1	59103.34	18753.16	2151.13	54818.06 To 63388.62
WIM 2	56369.37	19534.05	2240.71	51905.65 To 60833.09
Total	57736.35	19133.30	1551.92	54670.08 To 60802.63

Group	Minimum	Maximum
WIM 1	13485	85140
WIM 2	9315	86733
Total	9315	86733

Table 2. Descriptive statistics for WIM and static scales.

Group	Mean Gross Wt	Standard Deviation	Standard Error	95 Percent Confidence Interval for Mean
WIM	57736.35	19133.30	1551.92	54670.08 To 60802.63
Static	59564.74	19940.01	2287.28	55008.25 To 64121.22
Total	58345.82	19381.20	1283.55	55816.62 To 60875.01

Group	Minimum	Maximum
WIM	9315	86733
Static	17230	83330
Total	9315	86733

Vehicle Classification Test

The Golden River WIM system classifies vehicles based on the number of axles and the length of the spacing between them. Vehicles are classified according to Federal Highway Administration Scheme F. This vehicle classification scheme is summarized in Table 3 and presented in detail in Appendix A.

For the purpose of this study, the WIM systems were set to collect and record data for all vehicles class 5 (2-axle, 6-tire single unit trucks) and above. It should be noted that if the WIM system does not recognize the axle configuration of a vehicle it assigns it a class of 13. Thus, any vehicle classed as 13 that does not have 7 or more axles is considered an error and should be discarded from the data set.

Some errors in classification were noticed to occur during the validity and reliability test phase of the study. Four errors were observed in data from the downstream mat. The errors were in pairs, and appeared to result from the inability of the equipment to distinguish the end of one vehicle and the beginning of another. These errors represented only 5% of the data.

A more serious problem was observed in data from the upstream mat. Eleven classification errors were detected; five of these were failures of the equipment to identify the vehicle based on axle configurations (class of 13 was assigned). In the other six cases, the equipment assumed an extra axle and assigned the next highest class. Errors comprised 14% of the data for this equipment.

These classification errors were assumed to be an inherent feature of the portable WIM system. As other aspects appeared to be functioning properly and no error codes were generated during the test, the occasional misclassification of vehicles was accepted with misgivings.

Table 3. Vehicle classification scheme.

Vehicle Classification	Vehicle Type
1	Motorcycles
2	Passenger cars (including those hauling recreational trailers)
3	Two-axle, 4-tire pickups, vans, motor homes (including those with recreational trailers)
4	Buses
5	Two axle, 6-tire single unit trucks
6	Three axle single unit trucks
7	Four or more axle single unit trucks
8	Four or less axle single trailer trucks
9	Five axle single trailer trucks
10	Six or more axle single trailer trucks
11	Five or less axle multi-trailer trucks
12	Six axle multi-trailer trucks
13	Seven or more axle multi-trailer trucks

STUDY RESULTS

The data collection began in July 1988 and was scheduled for completion in mid-October 1988. It became apparent almost immediately that this time frame was unrealistic. WIM sites could be completed at a rate of only one or two sites per week. In addition, the WIM equipment experienced failures and manifested data errors that became more frequent as time went on. By the targeted data collection deadline, only eight sites had been completed.

Approximately 6 additional months were thus added to the study to complete data collection, and malfunctioning pieces of equipment were replaced with new units. It was decided, in conjunction with ADOT management, that five low-priority sites (7, 14, 16, 17, and 21) could be dropped from the study with little consequence.

Data were collected at the remaining 25 sites. It was discovered that the equipment had malfunctioned at site 4; the resulting data were unusable and the site was eliminated from analyses.

The main criterion for selection of the highway segment to install the WIM equipment was pavement smoothness and absence of rutting. Whenever possible, curves and grades were avoided, as were areas where vehicles might tend to accelerate or decelerate. The route and milepost settings for each site, the equipment used, and the date that data were collected are presented in Appendix B.

At each site, data were collected for 24 consecutive hours in one lane on each side of the highway. WIM mats were placed in the right-hand lane on each side, as it is estimated that the majority of heavy vehicle traffic utilizes this lane. WIM equipment was set to record the weight of vehicles class 5 and above (2D and larger).

WIM data at each site were retrieved from system memory to microcomputer. A sample of raw data output is presented in Figure 3. The data were subjected to extensive editing to remove blank lines, headings and extraneous characters so that they could be analyzed using SPSS/PC+ statistical software. Descriptive statistics were generated for

```
*BEGIN 47 01 03B10014 0 6.5 0 0157 030 0
*SEQ    DATE     TIME     SPD CL C LENG  VEH.TY  TOT   AXLE1 AXLE2 AXLE3 AXLE4 AXLE5 AXLE6 AXLE7 AXLE8 AXLE9 AXL10 AXL11 AXL12 AXL13
*AXLE SEPARATION                          TOTAL       1-2   2-3   3-4   4-5   5-6   6-7   7-8   8-9   9-10 10-11 11-12 12-13

00021 88/09/20 10:59:56.6 024 09 N 059.8       086664 10676 19525 20096 17898 18369
00021                                           055.0       010.5 004.5 035.7 004.4

00022 88/09/20 11:00:24.3 026 11 N 069.8       059817 09891 18526 19782 06123 05495
00022                                           064.2       011.3 020.6 009.8 022.7

00023 88/09/20 11:00:29.2 022 09 C 071.5       067824 09420 13031 15700 14444 15229
00023                                           062.9       018.0 004.3 036.1 004.7

00024 88/09/20 11:00:37.4 014 09 N 059.0       083681 10676 20724 21352 14915 16014
00024                                           051.1       014.4 003.8 028.8 004.2

00025 88/09/20 11:00:43.8 010 11 N 069.2       072220 10362 18683 18683 11932 12560
00025                                           063.2       011.1 019.9 009.6 022.6

00026 88/09/20 11:01:00.3 010 09 C 065.1       067981 10676 13659 12717 15229 15700
00026                                           051.2       013.9 004.2 029.0 004.2

00027 88/09/20 11:01:07.8 007 11 N 073.8       081797 12246 22765 17741 13659 15386
00027                                           067.9       010.9 021.0 010.4 025.8

00028 88/09/20 11:01:46.7 025 09 C 060.2       054008 11304 11304 11304 09420 10676
00028                                           051.3       011.6 004.3 031.3 004.0

00029 88/09/20 11:03:24.2 016 09 N 064.3       095142 08635 24178 18997 22451 20881
00029                                           058.3       018.8 004.5 031.1 004.0

00030 88/09/20 11:04:06.7 041 09 N 070.1       084823 11304 21509 22451 13345 16014
00030                                           062.6       019.8 004.5 034.3 004.2

00031 88/09/20 11:05:58.2 016 03 C 028.6       010519 04082 04239 02198
00031                                           025.5       010.1 015.5

00032 88/09/20 11:06:43.2 033 09 C 058.5       068452 11304 14915 14287 12560 15386
00032                                           051.8       009.3 004.3 034.2 004.2

00033 88/09/20 11:07:06.6 034 09 N 061.2       088391 11461 20567 18840 17898 19625
00033                                           056.5       015.1 004.7 032.5 004.3

00034 88/09/20 11:09:36.2 040 10 N 060.7       082111 12246 19782 16485 00628 16485 16485
00034                                           052.3       011.3 004.6 016.8 015.6 004.3

00035 88/09/20 11:10:13.2 039 09 C 064.0       056834 12717 17427 12874 07536 06280
00035                                           058.3       017.3 004.5 032.3 004.3
```

Figure 3. Raw data output.

each site in each direction. The sites were then aggregated into one database for further examination.

Prior to conducting inferential analyses, an attempt was made to eliminate vehicles that were misclassified. With guidance from knowledgeable ADOT personnel, the following vehicles were eliminated:

- 65 Class 13s with less than 7 axles
- 312 Class 13s with more than
- 333 Class 13s with a length of less than 50 feet
- 110 Class 13s with a length of more than 75 feet.

In addition, 61 vehicles were deleted with recorded gross weights or steering axle weights of zero. The edited database used in analysis consisted of 54,813 vehicles class 5 and above.

Frequency Analysis

Raw frequency data for individual sites are presented in Appendix C. Before sites could be compared with one another, several adjustments to the data were required. First, there were a few sites at which it was not possible to collect a full 24 hours of data. The frequencies for these sites were divided by the fraction of 24 hours that they represented to make them comparable to the 24 hour counts at other sites. (For example, if data were only collected at a given site from 12 midnight to 12 noon of the following day, the frequency would be divided by .5, or the ratio of 12 to 24 hours. In this example, it is easy to see that dividing by .5 produces the same result as multiplying the count by 2.)

It may be recollected that data were only collected in one lane of travel for each direction at a given site. Because nearly all of the chosen sites had two lanes in each direction, the frequencies had to be adjusted for number of lanes. For this purpose, 24 hour classification counts were taken at 15 designated WIM sites. The percentage of vehicles class 5 and above traveling in the outside lane was calculated (Table 4), and these were used to estimate total volumes at each site. At sites where classification data were not collected, the closest classification point was used for the adjustment. For remote sites

for which no classification data were available (1 South, 30 North and South) a 90%-10% lane split in truck traffic was assumed.

Knowing that traffic varies on different days of the week, it was considered desirable to attempt to "normalize" the frequency counts across days of the week so that a more appropriate comparison between sites might be accomplished. Unfortunately, classification data were only available for a 24-hour period at some sites, not the 7-day, 24-hour counts that were anticipated. For this reason, automatic traffic recorder (ATR) data for 1988 were used to adjust the data for day of the week*.

A listing of ATR locations that were used to adjust the WIM frequencies is presented in Table 5. A map of ATR locations is depicted in Figure 4. Divisor factors were arrived at by dividing the average 12-hour count for the day of week data were collected by the weekly average 12-hour count (see Appendix D).

**Note*: ATR data are not broken down by vehicle classification, and are thus a representation of all traffic at a given location. The author recognizes that truck traffic patterns may differ from those of other vehicles, so that using all traffic to adjust truck traffic volumes for day of the week may be inducing bias at some sites.

Table 4. Vehicle classification data

WIM Site	Direction	Classification Site Used	% Trucks in Outside Lane
1	North	None	100
	South		90*
2	East	2	93
	West		89
3	East	3	86
	West		89
5	East	5	86
	West		89
6	East	6	81
	West		72
8	East	8	79
	West		81
9	East	8	79
	West		81
10	East	10	92
	West		93
11	East	10	92
	West		93
12	East	10	92
	West		93
13	East	15	83
	West		84
15	East	15	83
	West		84
18	East	18	62
	West		79
19	North	19	92
	South		86
20	East	20	98
	West		97
22	East	20	98
	West		97
23	East	23	96
	West		98

**Estimates*

Table 4. Vehicle classification data (continued)

WIM Site	Direction	Classification Site Used	% Trucks in Outside Lane
24	North	None	100
	South		100
25	East	25	90
	West		89
26	North	25	90
	South		89
27	North	27	87
	South		87
28	North	28	90
	South		93
29	North	29	88
	South		74
30	North	None	90*
	South		90*

**Estimates*

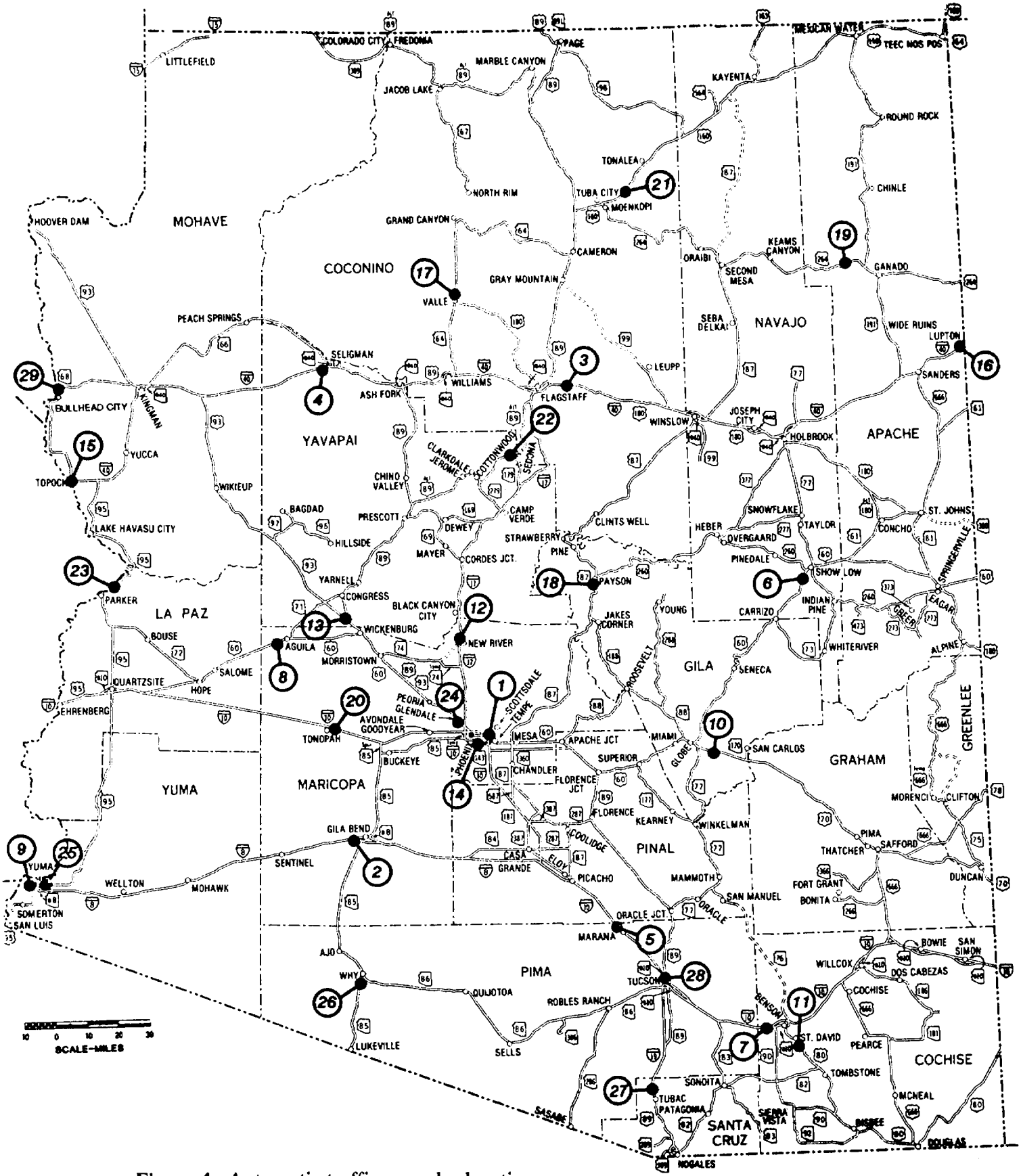


Figure 4. Automatic traffic recorder locations

Table 5. Automatic traffic recorder data

WIM Site	Direction	ATR Site Used	Day of Week	Adjustment Factor
1	North	4	Tuesday	.96
	South		Thursday	.99
2	East	4	Wednesday	1.02
	West		Wednesday	.94
3	East	4	Wednesday	1.02
	West		Wednesday	.94
5	East	3	Tuesday	.97
	West		Tuesday	.94
6	East	3	Monday	.82
	West		Monday	.99
8	East	3	Monday	.82
	West		Tuesday	.94
9	East	3	Wednesday	1.03
	West		Wednesday	.96
10	East	20	Wednesday	.96
	West		Wednesday	.91
11	East	20	Wednesday	.96
	West		Wednesday	.91
12	East	20	Thursday	1.00
	West		Thursday	.99
13	East	5	Thursday	.96
	West		Thursday	.97
15	East	5	Wednesday	.95
	West		Thursday	.97
18	East	7	Wednesday	.97
	West		Wednesday	.94
19	North	27	Tuesday	.92
	South		Tuesday	.91
20	East	25	Wednesday	1.07
	West		Wednesday	.97
22	East	2	Monday	.94
	West		Monday	1.00
23	East	5	Wednesday	.95
	West		Wednesday	.94
24	North	5	Tuesday	.90
	South		Tuesday	.87

Table 5. Automatic traffic recorder data (continued)

WIM Site	Direction	ATR Site Used	Day of Week	Adjustment Factor
25	East	1	Thursday	1.11
	West		Thursday	1.14
26	North	1	Tuesday	1.12
	South		Tuesday	1.14
27	North	12	Tuesday	.75
	South		Wednesday	.78
28	North	12	Tuesday	.75
	South		Tuesday	.77
29	North	12	Tuesday	.75
	South		Thursday	.83
30	North	3	Tuesday	.97
	South		Wednesday	.96

Frequency adjustments by site and direction are presented in Table 6. Adjusted frequencies are represented as daily truck volumes on Figure 5.

As was expected, the majority of trucks in the sample were class 9 (3S2). The percent of trucks in each vehicle class across all sites was as follows:

Class	Percent
5	10.8
6	3.8
7	.8
8	12.3
9	56.2
10	1.9
11	10.4
12	2.0
13	1.9

Table 6. Frequency adjustments by site and direction.

WIM Site	Direction	Raw 24 Hour Count	24 Hour Adjustment	Lane Adjustment	Day of Week Adjustment
1	North	475	--	--	495
	South	370	--	411	415
2	East	1068	1961	2109	2068
	West	1425	--	1601	1703
3	East	1654	--	1923	1885
	West	1735	--	1958	2082
5	East	1587	--	1845	1902
	West	1717	--	1929	2052
6	East	1445	--	1784	2176
	West	1782	--	2475	2500
8	East	1243	--	1573	1918
	West	1736	--	2143	2280
9	East	2003	--	2535	2461
	West	2061	--	2544	2650
10	East	996	1567	1703	1774
	West	1534	1888	1888	2231
11	East	2239	--	2434	2535
	West	1952	--	2099	2307
12	East	1788	--	1943	1943
	West	1743	--	1874	1893
13	East	2228	--	2684	2796
	West	1865	2058	2450	2526
15	East	2749	--	3312	3486
	West	275	2391	2846	2934
18	East	1434	--	2313	2389
	West	1235	--	1563	1663
19	North	503	--	547	595
	South	520	--	605	665

Table 6. Frequency adjustments by site and direction (continued)

WIM Site	Direction	Raw 24 Hour Count	24 Hour Adjustment	Lane Adjustment	Day of Week Adjustment
20	East	507	--	517	483
	West	491	--	506	533
22	East	543	--	554	589
	West	653	--	673	673
23	East	636	--	663	698
	West	815	--	832	885
24	North	795	--	--	828
	South	971	--	--	1116
25	East	370	--	411	370
	West	366	--	411	361
26	North	168	--	187	167
	South	132	--	148	130
27	North	930	--	1069	1425
	South	1213	--	1394	1787
28	North	809	--	899	1199
	South	1258	--	1353	1757
29	North	767	--	872	1163
	South	896	--	1211	1459
30	North	281	--	312	322
	South	307	--	341	355

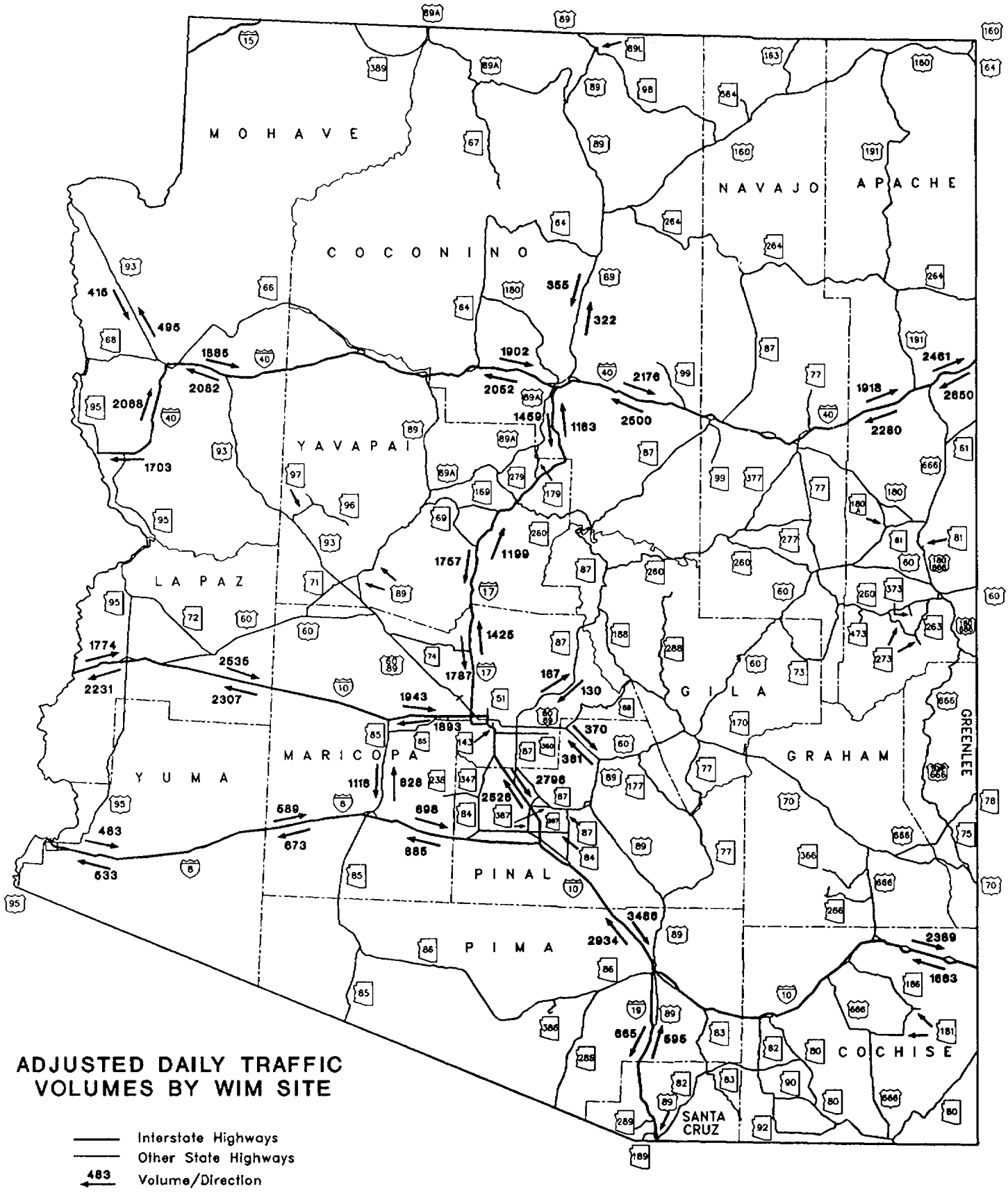


Figure 5. Adjusted daily truck volumes by WIM site.

Weight Analysis

Average gross weights and steering axle weights by vehicle classification for each site were computed; the results are included in Appendix E. The data were then aggregated, and the average gross truck weight and steering axle weight by vehicle class were computed. The results are presented in Table 7. As was expected, truck weight generally increases with vehicle classification, so that larger trucks have a higher average weight than smaller trucks.

Generally, trucks using the Interstate routes were significantly heavier than those using State or U.S. routes, $F(1,54811) = 589.86$, $p < .0001$ (See Appendix F for analysis tables). Trucks on Interstate routes averaged nearly 13,000 lbs. more than trucks on non-Interstate routes.

Of particular interest for pavement design purposes is the average truck weight by route. Means by route are presented in descending order in Figure 6. It is immediately apparent that trucks on I-17 and I-40 weigh more on the average than trucks on other routes. This might be due to the type of commodity that the vehicles are transporting (e.g., manufactured goods vs. produce). Whatever the reason, this is an important finding which should be taken into consideration in the pavement design process.

Table 7. Mean gross and steering axle weights by vehicle class.

Gross weight

Classification	Mean	Std. Dev.	Cases
5	19672.3278	23060.6713	5893
6	34205.9404	37966.3588	2079
7	38757.8384	40896.2133	464
8	43343.9743	43394.3005	6737
9	59262.8950	22268.1645	30795
10	70087.7175	49813.1917	1055
11	60689.1964	32348.6569	5689
12	68680.1964	38683.6016	1069
13	67919.8421	50998.7378	1032
For Entire Sample	52629.0442	32541.7158	54813

Steering axle weight

Classification	Mean	Std. Dev.	Cases
5	8035.3214	12917.7699	5893
6	10171.9062	15069.1214	2079
7	8230.1013	11986.9905	464
8	10009.7475	14701.8980	6737
9	6968.0271	2730.7629	30795
10	9149.0995	11036.4216	1055
11	7447.9093	7605.4953	5689
12	7608.0935	7394.0663	1069
13	7913.8130	8326.0178	1032
For Entire Sample	7710.9068	8395.0717	54813

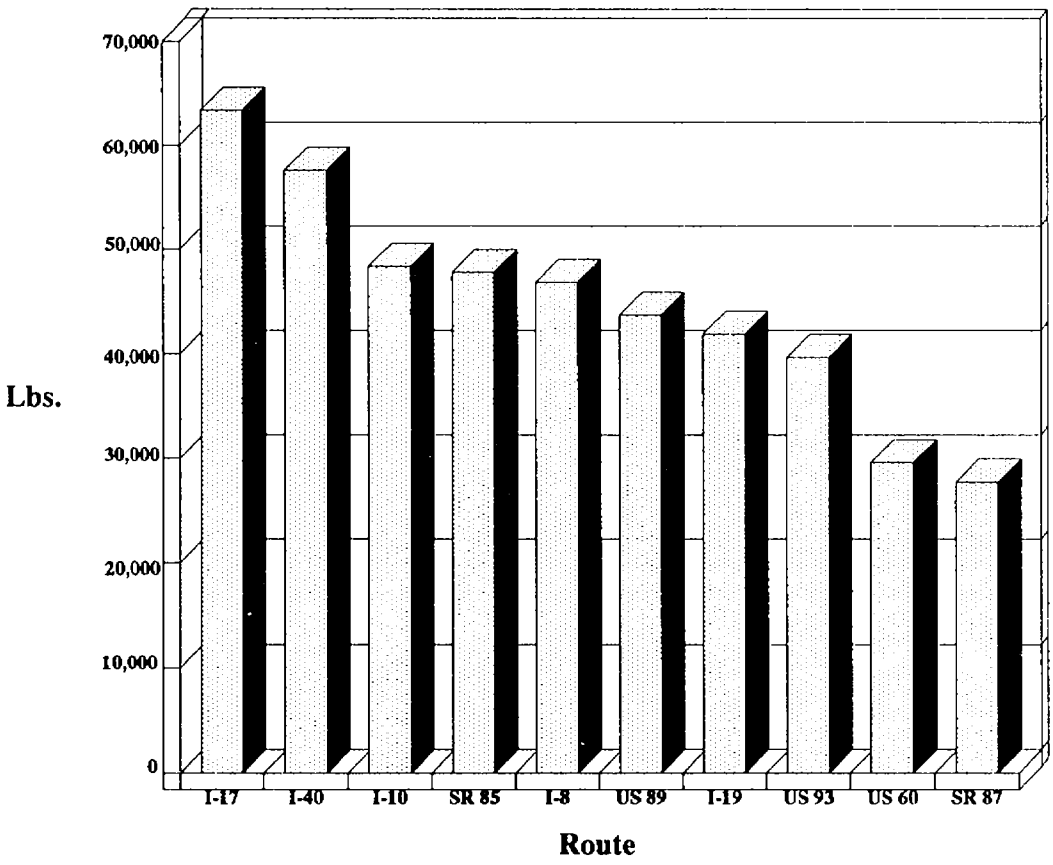


Figure 6. Mean gross weight by route.

Equipment Analysis

Because three of the Weighman machines used in this study were new (numbers 73, 74, and 80) and the other three were several years old (numbers 3, 5, and 14), it was suspected that there might be a difference in their operation. Unfortunately, the reliability tests which were conducted used machines of the same age. An analysis of gross weight by machine was thus considered imperative.

Average gross truck weights by machine type for Interstate routes are presented in Figure 7. Observing this figure, it appears that there is a weight difference which can be attributed to machine age: new machines appear, on the average, to weigh "lighter" than old machines. Statistical analysis confirms that the average gross weights for the six machines differ significantly from each other ($F(9,50705) = 136.01$, $p < .0001$), as do the steering axle weights ($F(9,50705) = 159.59$, $p < .0001$).

Because it has already been established that average truck weights differ significantly by route, an analysis was conducted to rule out the possibility that the difference in weights by machine age can actually be attributed to the routes on which the machines were placed. When routes are held constant, a significant weight difference is still found for machine age, with older machines weighing heavier on the average than the newer machines (see Appendix F).

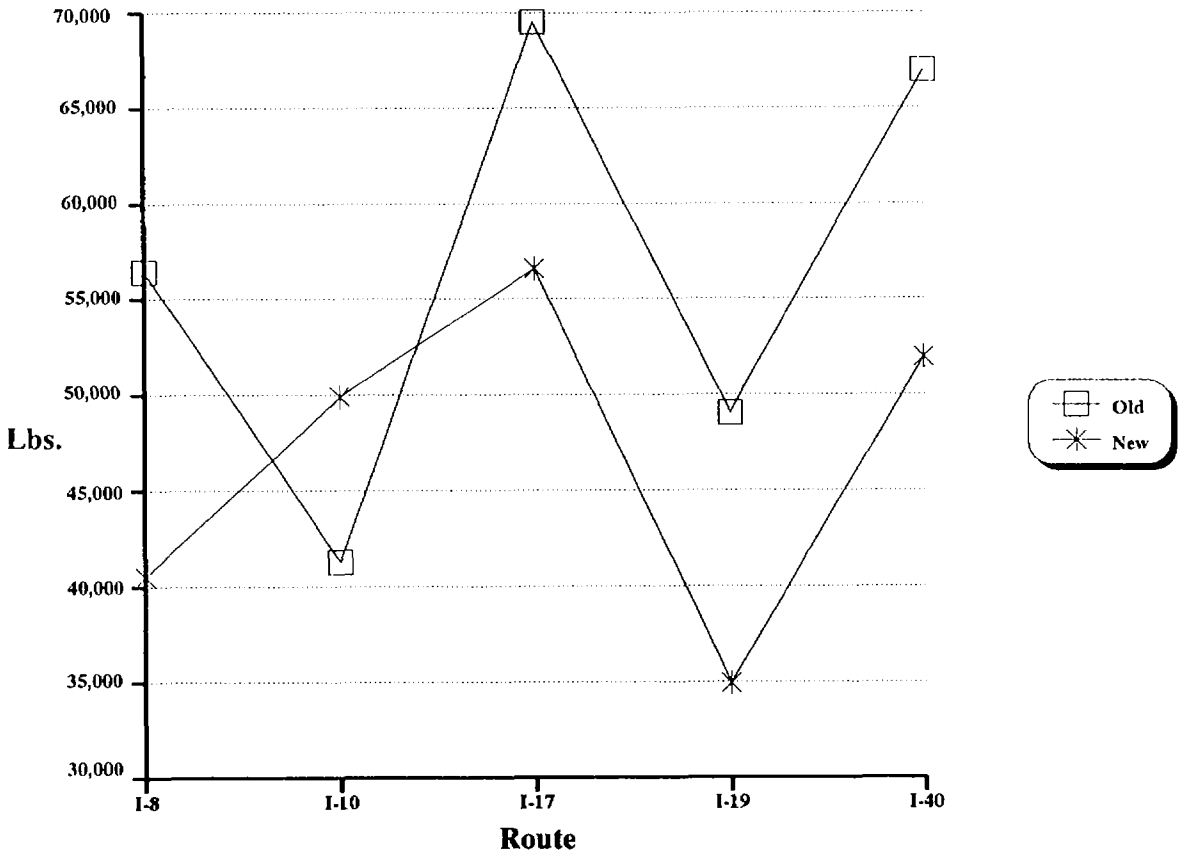


Figure 7. Mean gross weight by machine type by route.

DISCUSSION

Overall, WIM equipment appears to be a viable alternative to the loadometer for heavy vehicle data collection purposes: the sheer volume of data collected represents a significant improvement over the traditional loadometer approach. Although the weight variations (e.g., standard deviations) are much higher than desirable, it appears that the WIM systems *on the average* estimate gross truck weights within reasonable limits.

However, some difficulties with the systems have been observed and should be mentioned. Perhaps the most notable of these is the equipment's erratic behavior. A successful installation in no way guaranteed proper system performance, as it was noticed that the system frequently functioned improperly or ceased to function altogether. (For details concerning problems on individual site installations, refer to the site notes in Appendix G.)

Another identified problem was the tendency for temporary loops to be torn off of the pavement by heavy traffic. Use of a special adhesive on the pavement surface before taping the loops almost eliminated this difficulty. The adhesive primer also helped the system to remain affixed in rainy weather conditions. Still, greater success in installation overall was achieved with existing loops embedded in the pavement.

By the end of the study, the WIM systems were definitely showing signs of wear. Mat surfaces became ostensibly dimpled, and their metal edges had broken from fatigue. Several months after the data were collected, it was discovered that the cold solder joints connecting the oscillator wire to the plates inside the mat had disintegrated. It is not known what effect this had on data collection, as it is not possible to determine when the damage occurred.

At times, the equipment ceased to function for no apparent reason. Frequently, troubleshooting was required on site, necessitating that a technician be present on location during all testing. Some problems are still a mystery.

RECOMMENDATIONS

It is clear that portable WIM systems can be valuable tools for extensive data collection efforts such as that required for pavement design. It is evident, however, that far more research and development is necessary before the particular portable WIM system used in this study can be put to practical use by non- technical personnel.

Still, the advantages of using weigh in motion systems over traditional loadometer testing appear to outweigh the disadvantages. The use of WIM equipment has facilitated the collection of a large amount of data system-wide, which would not have been possible by any other means. Because data were collected over full 24 hour periods at most sites, they are most likely more representative of total truck traffic on the state highway system than loadometer data.

It is recommended that the use of WIM equipment for truck data collection be further explored. The installation of permanent loops at selected sites would greatly facilitate future data collection efforts. Before beginning another large-scale data collection effort, however, it is recommended that the different portable WIM systems currently on the market be evaluated with an eye toward minimizing measurement error and equipment problems.

REFERENCES

(1) Basson, J.E.B, Visser, A.T., and Freeme, C.R. (1988). *In-motion weighing of vehicles on heavily trafficked roads*. Transportation Research Board, Transportation Research Record 1200, 1-6.

(2) Izadmehr, B. and Lee, C.L. (1988). *Accuracy and tolerances of weigh-in-motion systems*. Transportation Research Board, Transportation Research Record 1123, 127-135.

(3) Broussard, D.T. (1988). *Weigh-in-motion for planning applications in Louisiana*. Federal Highway Administration, Report No. FHWA/LA-87/196.

(4) Davies, P. and Sommerville, F. (1988). *Calibration and accuracy testing of weigh-in-motion systems*. Transportation Research Board, Transportation Research Record 1123, 122- 126.

APPENDICES

APPENDIX A
Vehicle Classification Scheme

Vehicle Classification Records

1. General Comments

Vehicle classification data collected at truck weigh sites are necessary to expand the truck weight information to the distribution of the various types of trucks in the traffic stream. The FHWA vehicle classification categories are discussed in Section 4 and the definitions are repeated here as a reference for the vehicle classification record format immediately following them.

Type Name and Description

1. Motorcycles (Optional) -- All two- or three-wheeled motorized vehicles. Typical vehicles in this category have saddle-type seats and are steered by handle bars rather than a wheel. This category includes motorcycles, motor scooters, mopeds, motor-powered bicycles, and three-wheel motorcycles. This vehicle type may be reported at the option of the State.

2. Passenger Cars -- All sedans, coupes, and station wagons manufactured primarily for the purpose of carrying passengers and including those passenger cars pulling recreational or other light trailers.

3. Other Two-Axle, Four-Tire Single Unit Vehicles -- All two-axle, four-tire vehicles, other than passenger cars. Included in this classification are pickups, panels, vans and other vehicles such as campers, motor homes, ambulances, hearses, and carryalls. Other two-axle, four-tire single unit vehicles pulling recreational or other light trailers are included in this classification.

4. Buses -- All vehicles manufactured as traditional passenger-carrying buses with two axles and six tires or three or more axles. This category includes only traditional buses (including school buses) functioning as passenger-carrying vehicles. All two-axle, four-tire minibuses should be classified as other two-axle, four-tire single unit vehicles. Modified buses should be considered to be a truck and be appropriately classified.

NOTE: In reporting information on trucks the following criteria should be used:

a. Truck tractor units traveling without a trailer will be considered single unit trucks.

b. A truck tractor unit pulling other such units in a "saddle mount" configuration will be considered as one single unit truck and will be defined only by the axles on the pulling unit.

c. Vehicles shall be defined by the number of axles in contact with the roadway. Therefore, "floating" axles are counted only when in the down position.

d. The term "trailer" includes both semi- and full trailers.

5. Two-Axle, Six-Tire, Single Unit Trucks -- All vehicles on a single fram including trucks, camping and recreational vehicles, motor homes, etc., having two axles and dual rear wheels.

6. Three-Axle Single Unit Trucks -- All vehicles on a single frame including trucks, camping and recreational vehicles, motor homes, etc., having three axles.

7. Four or More Axle Single Unit Trucks -- All trucks on a single frame with four or more axles.

8. Four or Less Axle Single Trailer Trucks -- All vehicles with four or less axles consisting of two units, one of which is a tractor or straight truck power unit.

9. Five-Axle Single Trailer Trucks -- All five-axle vehicles consisting of two units, one of which is a tractor or straight truck power unit.

10. Six or More Axle Single Trailer Trucks -- All vehicles with six or more axles consisting of two units, one of which is a tractor or straight truck power unit.

11. Five or Less Axle Multi-Trailer Trucks -- All vehicles with five or less axles consisting of three or more units, one of which is a tractor or straight truck power unit.

12. Six-Axle Multi-Trailer Trucks -- All six-axle vehicles consisting of three or more units, one of which is a tractor or straight truck power unit.

13. Seven or More Axle Multi-Trailer Trucks -- All vehicles with seven or more axles consisting of three or more units, one of which is a tractor or straight truck power unit.

DESCRIPTION	CLASS	ALGORITHM
Motorcycles	1	2 AXLE: A1-A2 < 70"
Passenger Cars*	2	2 AXLE: A1-A2 < 120" 3 AXLE: A1-A2 < 120" AND AND 10' < A2-A3 < 18' 4 AXLE: A1-A2 < 120" AND A3-A4 < 3.5'
Other 2 Axle, 4 Tire, Single Unit Vehicles*	3	2 AXLE: 10' < A1-A2 < 13' 3 AXLE: 10' < A1-A2 < 13' AND 10' < A2-A3 < 18' 4 AXLE: 10' < A1-A2 < 13' AND A3-A4 < 3.5' 5 AXLE: 10' < A1-A2 < 15' AND A4-A5 < 3.5'
Buses	4	2 AXLE: A1-A2 > 23' 3 AXLE: A1-A2 > 19'
2 Axle, 6 Tire, Single Unit Trucks*	5	2 AXLE: 13' < A1-A2 < 23' 5 AXLE: 15' < A1-A2 < 20' AND A4-A5 < 3.5'
3 Axle, Single Unit Trucks	6	3 AXLE: ANY NOT CLASSIFIED ELSEWHERE
4 or more Axle, Single Unit Trucks	7	4 AXLE: ANY NOT CLASSIFIED ELSEWHERE
4 or less Axle Single Trailer Trucks	8	3 AXLE: A2-A3 > 18' 4 AXLE: A2-A3 > 5' AND A3-A4 > 3.5' 4 AXLE: A2-A3 <= 5' AND A3-A4 > 10'
5 Axle Single Trailer Trucks	9	5 AXLE: 3.5' < A4-A5 <=8' AND A2-A3 < 6.1' 5 AXLE: ANY NOT CLASSIFIED ELSEWHERE
6 or more Axle Single Trailer Trucks	10	6 AXLE: 3.5' < A3-A4 < 5' 6 AXLE: ANY NOT CLASSIFIED ELSEWHERE
5 or less Axle Multi-Trailer Trucks	11	5 AXLE: A2-A3 > 6'
6 Axle Multi-Trailer Trucks	12	6 AXLE: A5-A6 > 10'
7 or More Axle Multi-Trailer Trucks	13	7 AXLE: ANY 7 AXLE VEHICLE ANY VEHICLE NOT CLASSIFIED ELSEWHERE

* Includes vehicles pulling recreational or other light trailers.

APPENDIX B
WIM Data Collection Sites

WIM Data Collection Sites

WIM Site	Direction	Date	Route	Milepost	Machine No.
1	North	10/4/88	US 93	035.2	74
	South	10/6/88	US 93	047.5	14
2	East	11/2/88	I-40	009.0	14
	West	11/2/88	I-40	009.0	74
3	East	5/31/89	I-40	056.0	80
	West	5/31/89	I-40	056.0	74
5	East	10/25/88	I-40	179.7	14
	West	10/25/88	I-40	179.7	74
6	East	9/12/88	I-40		5
	West	9/12/88	I-40		14
8	East	11/7/88	I-40	319.5	74
	West	11/8/88	I-40	319.5	5
9	East	5/10/89	I-40	343.0	80
	West	5/10/89	I-40	343.0	74
10	East	3/9/89	I-10	014.0	74
	West	3/9/89	I-10	014.0	73
11	East	2/1/89	I-10	041.0	74
	West	5/17/89	I-10	041.0	80
12	East	7/14/88	I-10	129.2	14
	West	7/14/88	I-10	129.2	3
13	East	4/13/89	I-10	180.0	73
	West	4/13/89	I-10	180.0	80
15	East	3/16/89	I-10	239.5	73
	West	12/1/88	I-10	239.5	74
18	East	4/26/89	I-10	360.0	74
	West	4/26/89	I-10	360.0	73
19	North	4/18/89	I-19	046.0*	14
	South	4/18/89	I-19	046.0*	80
20	East	5/3/89	I-8		80
	West	5/3/89	I-8		74
22	East	5/1/89	I-8	105.0	74
	West	5/1/89	I-8	105.0	80
23	East	9/28/88	I-8	134.5	3
	West	9/28/88	I-8	134.5	14
24	North	9/27/88	SR 85	149.0	3
	South	9/27/88	SR 85	149.0	74

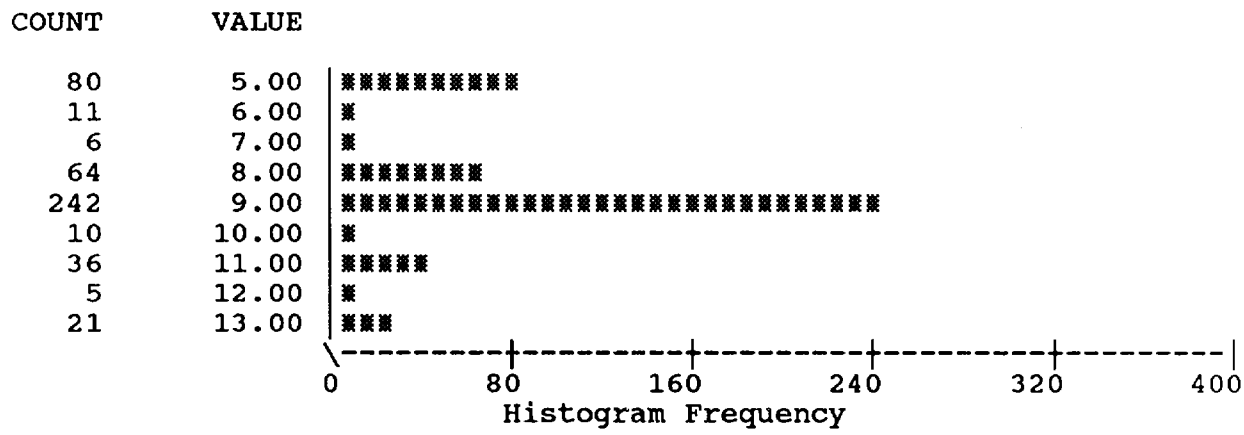
*Kilometer post

WIM Site	Direction	Date	Route	Milepost	Machine No.
25	East	2/16/89	US 60	206.0	73
	West	2/16/89	US 60	206.0	74
26	North	2/28/89	SR 87	200.2	73
	South	2/28/89	SR 87	199.1	74
27	North	11/29/88	I-17	233.4	80
	South	5/24/89	I-17	242.0	74
28	North	10/18/88	I-17	273.0	74
	South	10/18/88	I-17	269.5	14
29	North	8/23/88	I-17	335.0	14
	South	10/27/88	I-17	335.0	3
30	North	9/13/88	US 89	434.2	14
	South	9/14/88	US 89	434.2	14

APPENDIX C
Frequency Data for Individual Sites

1 NORTH

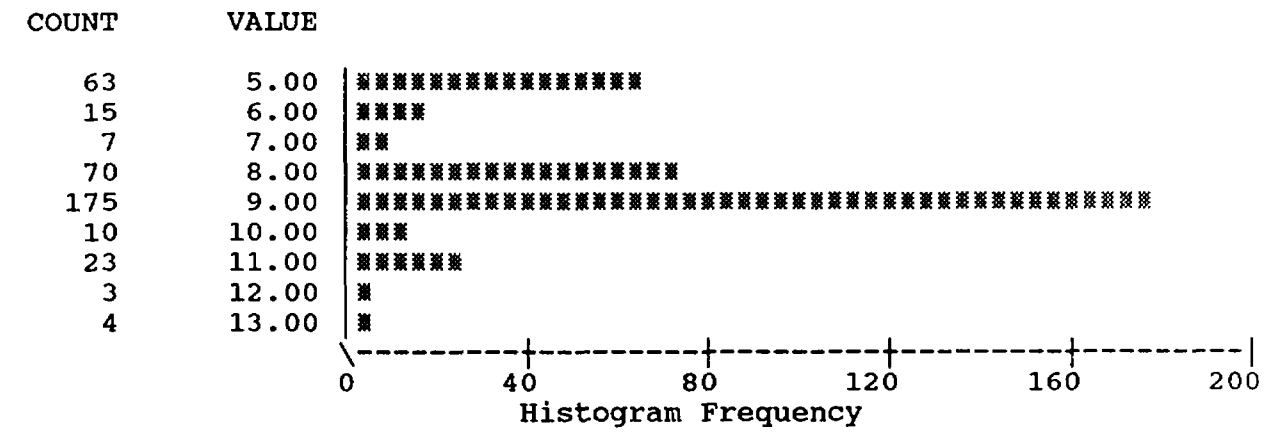
Value	Frequency	Percent	Valid Percent	Cum Percent
5	80	16.8	16.8	16.8
6	11	2.3	2.3	19.2
7	6	1.3	1.3	20.4
8	64	13.5	13.5	33.9
9	242	50.9	50.9	84.8
10	10	2.1	2.1	86.9
11	36	7.6	7.6	94.5
12	5	1.1	1.1	95.6
13	21	4.4	4.4	100.0
TOTAL	475	100.0	100.0	



Valid Cases 475 Missing Cases 0

1 SOUTH

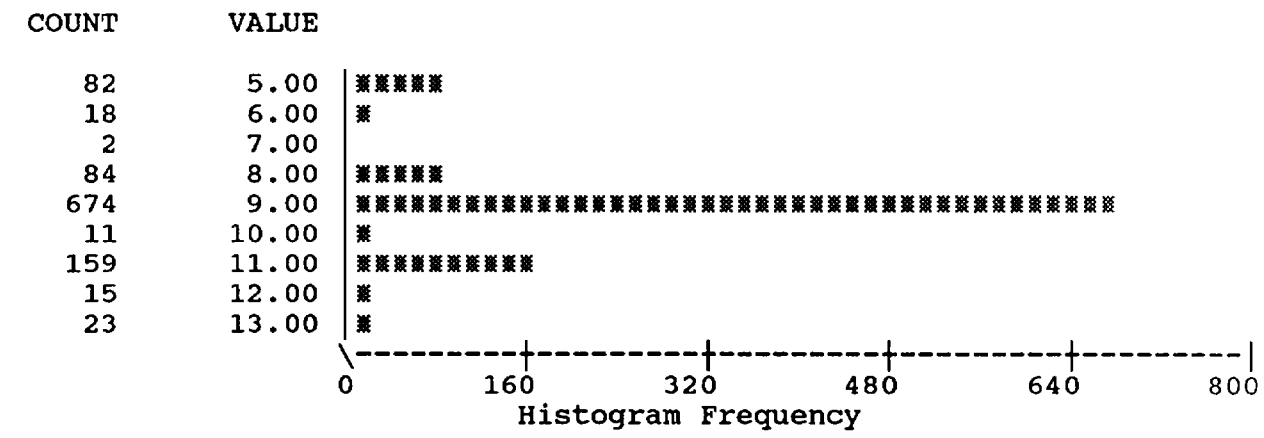
Value	Frequency	Percent	Valid Percent	Cum Percent
5	63	17.0	17.0	17.0
6	15	4.1	4.1	21.1
7	7	1.9	1.9	23.0
8	70	18.9	18.9	41.9
9	175	47.3	47.3	89.2
10	10	2.7	2.7	91.9
11	23	6.2	6.2	98.1
12	3	.8	.8	98.9
13	4	1.1	1.1	100.0
TOTAL	370	100.0	100.0	



Valid Cases 370 Missing Cases 0

2 EAST

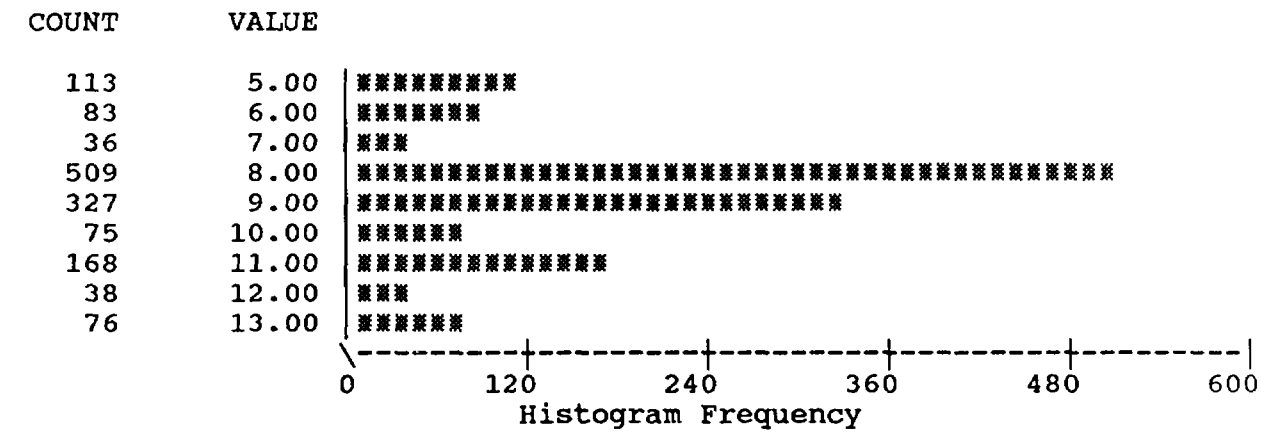
Value	Frequency	Percent	Valid Percent	Cum Percent
5	82	7.7	7.7	7.7
6	18	1.7	1.7	9.4
7	2	.2	.2	9.6
8	84	7.9	7.9	17.4
9	674	63.1	63.1	80.5
10	11	1.0	1.0	81.6
11	159	14.9	14.9	96.4
12	15	1.4	1.4	97.8
13	23	2.2	2.2	100.0
TOTAL	1068	100.0	100.0	



Valid Cases 1068 Missing Cases 0

2 WEST

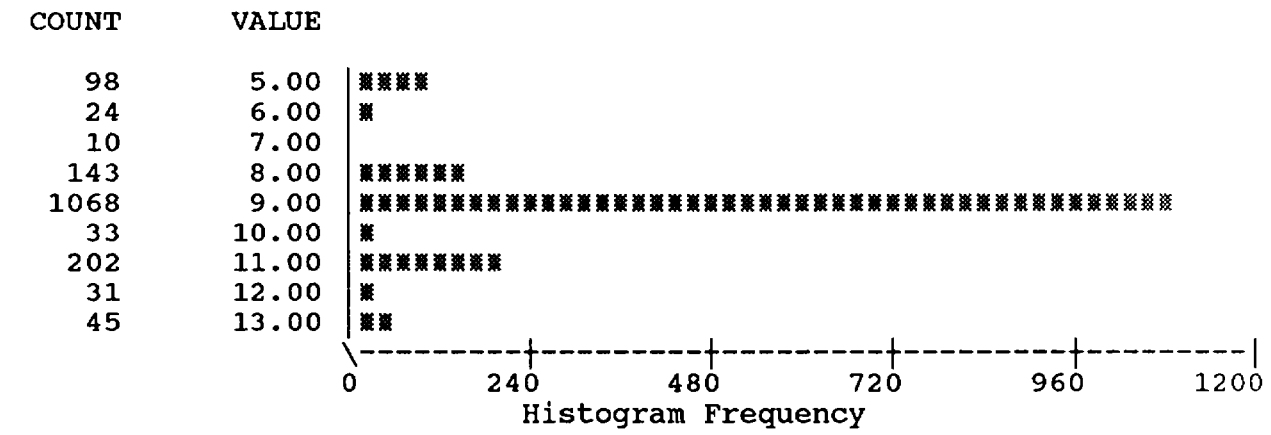
Value	Frequency	Percent	Valid Percent	Cum Percent
5	113	7.9	7.9	7.9
6	83	5.8	5.8	13.8
7	36	2.5	2.5	16.3
8	509	35.7	35.7	52.0
9	327	22.9	22.9	74.9
10	75	5.3	5.3	80.2
11	168	11.8	11.8	92.0
12	38	2.7	2.7	94.7
13	76	5.3	5.3	100.0
TOTAL	1425	100.0	100.0	



Valid Cases 1425 Missing Cases 0

3 EAST

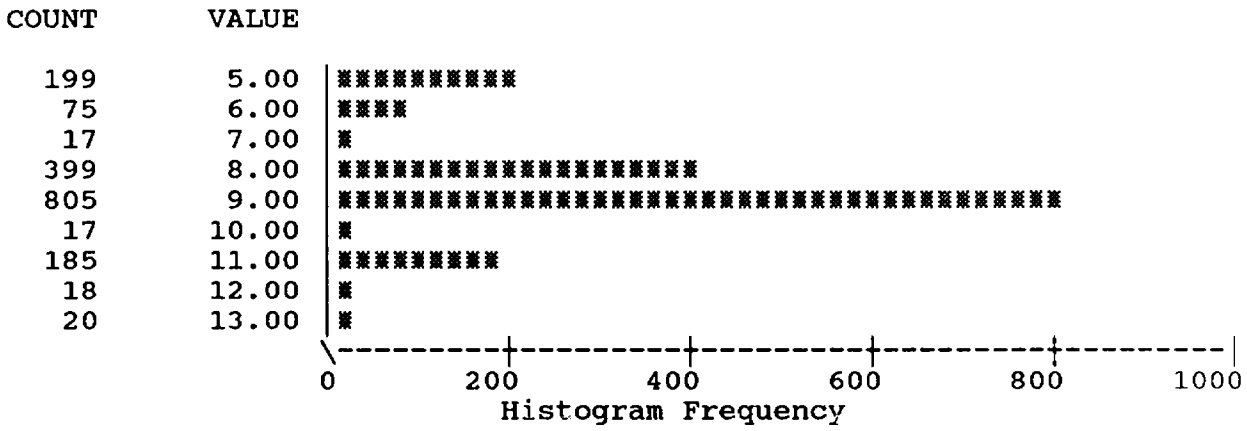
Value	Frequency	Percent	Valid Percent	Cum Percent
5	98	5.9	5.9	5.9
6	24	1.5	1.5	7.4
7	10	.6	.6	8.0
8	143	8.6	8.6	16.6
9	1068	64.6	64.6	81.2
10	33	2.0	2.0	83.2
11	202	12.2	12.2	95.4
12	31	1.9	1.9	97.3
13	45	2.7	2.7	100.0
TOTAL	1654		100.0	100.0



Valid Cases 1654 Missing Cases 0

3 WEST

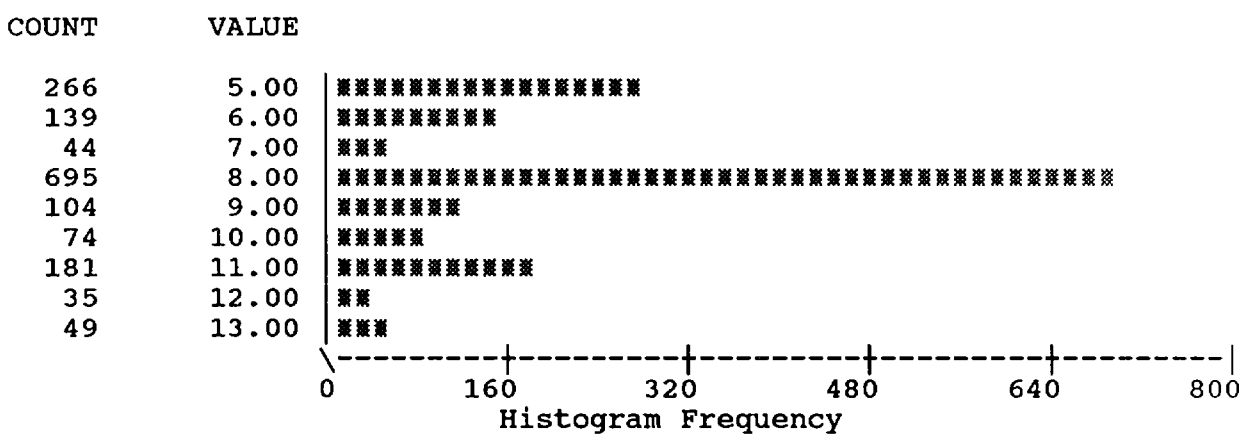
Value	Frequency	Percent	Valid Percent	Cum Percent
5	199	11.5	11.5	11.5
6	75	4.3	4.3	15.8
7	17	1.0	1.0	16.8
8	399	23.0	23.0	39.8
9	805	46.4	46.4	86.2
10	17	1.0	1.0	87.1
11	185	10.7	10.7	97.8
12	18	1.0	1.0	98.8
13	20	1.2	1.2	100.0
TOTAL	1735	100.0	100.0	



Valid Cases 1735 Missing Cases 0

5 EAST

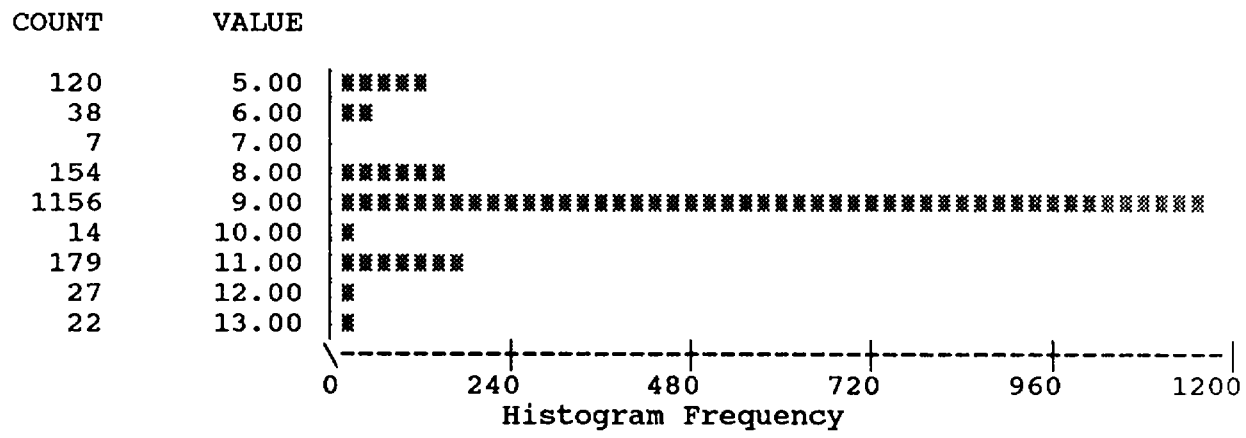
Value	Frequency	Percent	Valid Percent	Cum Percent
5	266	16.8	16.8	16.8
6	139	8.8	8.8	25.5
7	44	2.8	2.8	28.3
8	695	43.8	43.8	72.1
9	104	6.6	6.6	78.6
10	74	4.7	4.7	83.3
11	181	11.4	11.4	94.7
12	35	2.2	2.2	96.9
13	49	3.1	3.1	100.0
TOTAL	1587	100.0	100.0	



Valid Cases 1587 Missing Cases 0

5 WEST

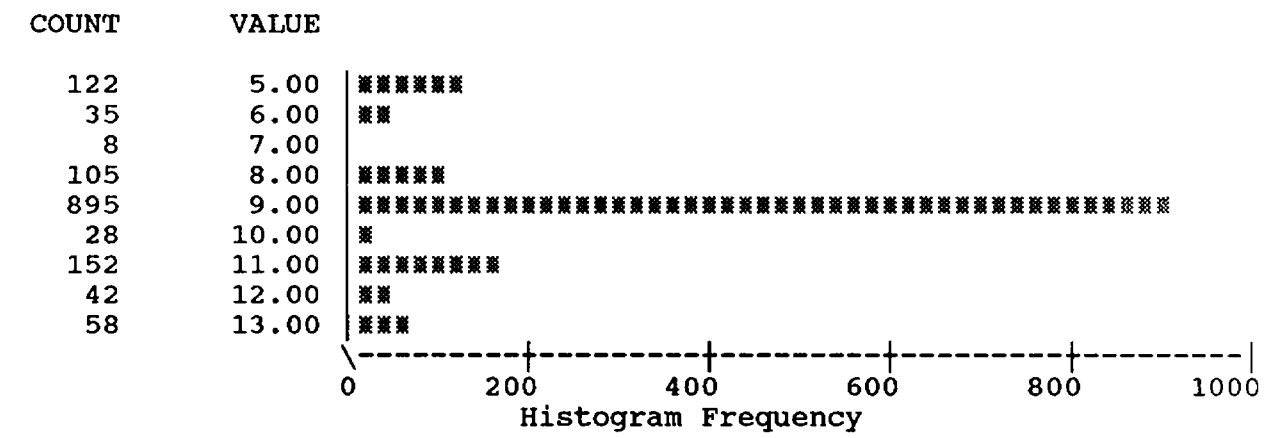
Value	Frequency	Percent	Valid Percent	Cum Percent
5	120	7.0	7.0	7.0
6	38	2.2	2.2	9.2
7	7	.4	.4	9.6
8	154	9.0	9.0	18.6
9	1156	67.3	67.3	85.9
10	14	.8	.8	86.7
11	179	10.4	10.4	97.1
12	27	1.6	1.6	98.7
13	22	1.3	1.3	100.0
TOTAL	1717	100.0	100.0	



Valid Cases 1717 Missing Cases 0

6 EAST

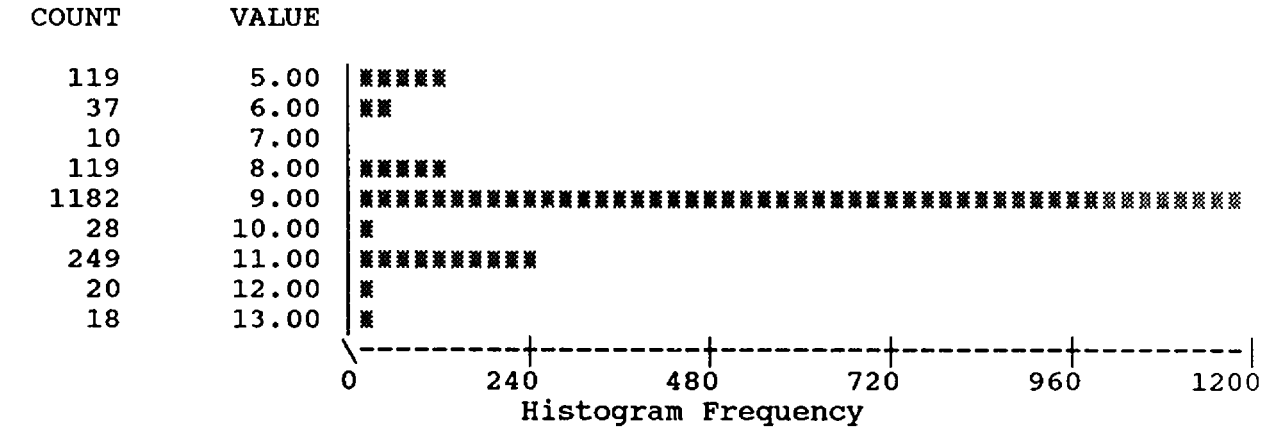
Value	Frequency	Percent	Valid Percent	Cum Percent
5	122	8.4	8.4	8.4
6	35	2.4	2.4	10.9
7	8	.6	.6	11.4
8	105	7.3	7.3	18.7
9	895	61.9	61.9	80.6
10	28	1.9	1.9	82.6
11	152	10.5	10.5	93.1
12	42	2.9	2.9	96.0
13	58	4.0	4.0	100.0
TOTAL	1445	100.0	100.0	



Valid Cases 1445 Missing Cases 0

6 WEST

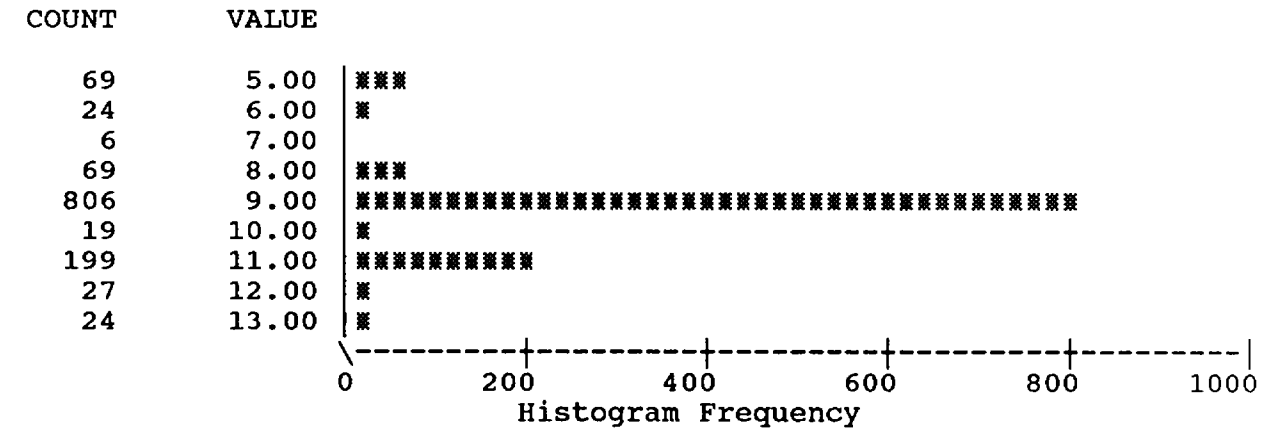
Value	Frequency	Percent	Valid Percent	Cum Percent
5	119	6.7	6.7	6.7
6	37	2.1	2.1	8.8
7	10	.6	.6	9.3
8	119	6.7	6.7	16.0
9	1182	66.3	66.3	82.3
10	28	1.6	1.6	83.9
11	249	14.0	14.0	97.9
12	20	1.1	1.1	99.0
13	18	1.0	1.0	100.0
TOTAL	1782	100.0	100.0	



Valid Cases 1782 Missing Cases 0

8 EAST

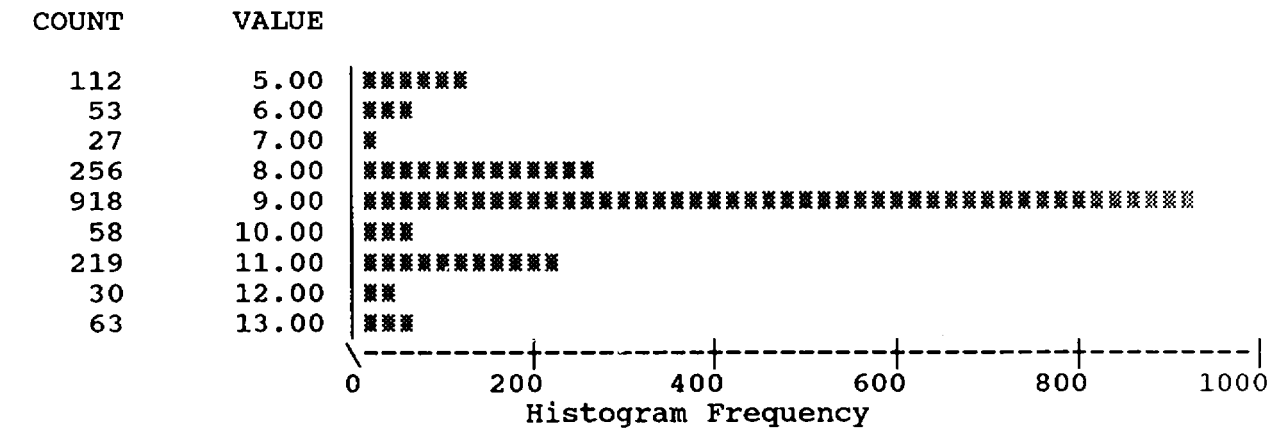
Value	Frequency	Percent	Valid Percent	Cum Percent
5	69	5.6	5.6	5.6
6	24	1.9	1.9	7.5
7	6	.5	.5	8.0
8	69	5.6	5.6	13.5
9	806	64.8	64.8	78.4
10	19	1.5	1.5	79.9
11	199	16.0	16.0	95.9
12	27	2.2	2.2	98.1
13	24	1.9	1.9	100.0
TOTAL	1243	100.0	100.0	



Valid Cases 1243 Missing Cases 0

8 WEST

Value	Frequency	Percent	Valid Percent	Cum Percent
5	112	6.5	6.5	6.5
6	53	3.1	3.1	9.5
7	27	1.6	1.6	11.1
8	256	14.7	14.7	25.8
9	918	52.9	52.9	78.7
10	58	3.3	3.3	82.0
11	219	12.6	12.6	94.6
12	30	1.7	1.7	96.4
13	63	3.6	3.6	100.0
TOTAL	1736	100.0	100.0	



Valid Cases 1736 Missing Cases 0

9 EAST

Value	Frequency	Percent	Valid Percent	Cum Percent
5	113	5.6	5.6	5.6
6	17	.8	.8	6.5
7	9	.4	.4	6.9
8	124	6.2	6.2	13.1
9	1480	73.9	73.9	87.0
10	9	.4	.4	87.5
11	227	11.3	11.3	98.8
12	19	.9	.9	99.8
13	5	.2	.2	100.0
TOTAL	2003	100.0	100.0	

COUNT	VALUE	
113	5.00	#####
17	6.00	#
9	7.00	
124	8.00	#####
1480	9.00	##
9	10.00	
227	11.00	#########
19	12.00	#
5	13.00	

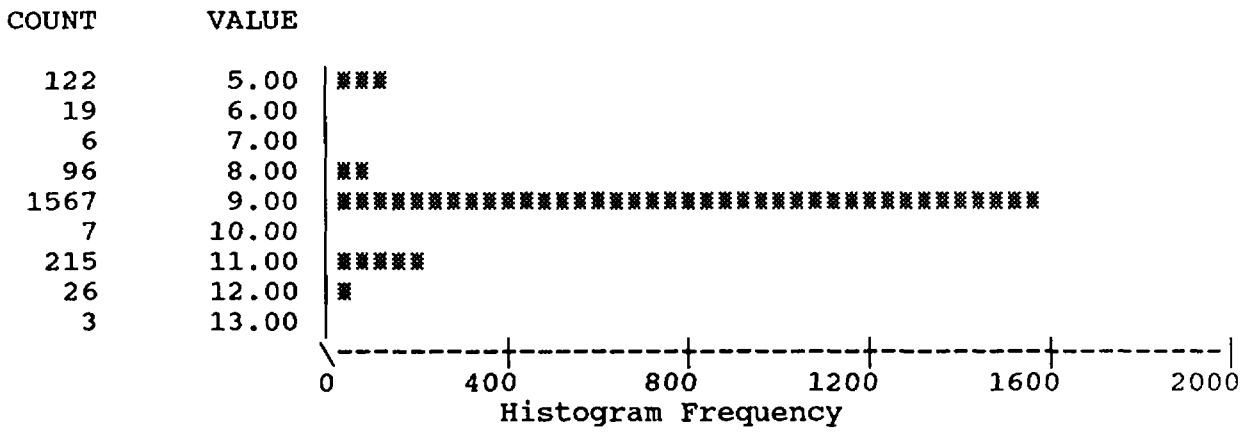
0 300 600 900 1200 1500

Histogram Frequency

Valid Cases 2003 Missing Cases 0

9 WEST

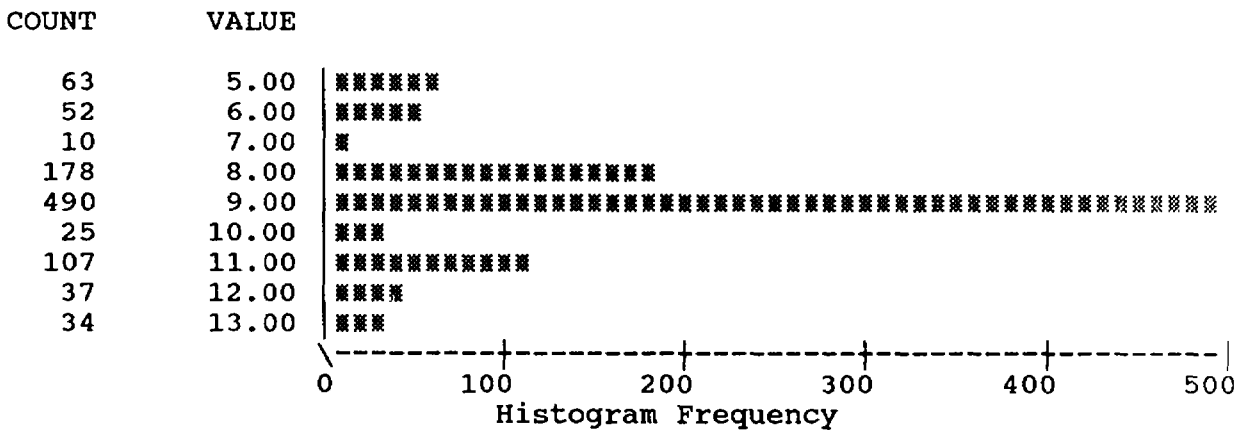
Value	Frequency	Percent	Valid Percent	Cum Percent
5	122	5.9	5.9	5.9
6	19	.9	.9	6.8
7	6	.3	.3	7.1
8	96	4.7	4.7	11.8
9	1567	76.0	76.0	87.8
10	7	.3	.3	88.2
11	215	10.4	10.4	98.6
12	26	1.3	1.3	99.9
13	3	.1	.1	100.0
TOTAL	2061	100.0	100.0	



Valid Cases 2061 Missing Cases 0

10 EAST

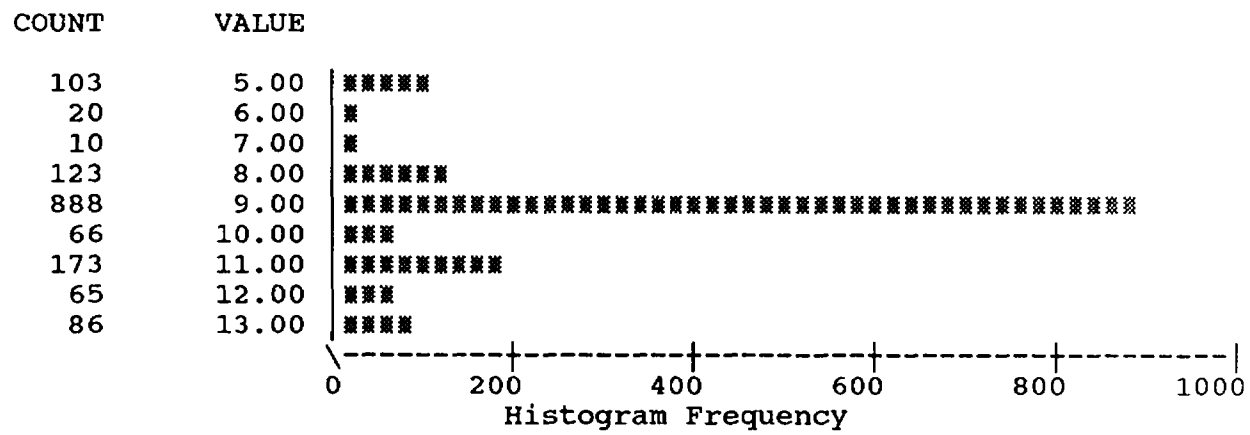
Value	Frequency	Percent	Valid Percent	Cum Percent
5	63	6.3	6.3	6.3
6	52	5.2	5.2	11.5
7	10	1.0	1.0	12.6
8	178	17.9	17.9	30.4
9	490	49.2	49.2	79.6
10	25	2.5	2.5	82.1
11	107	10.7	10.7	92.9
12	37	3.7	3.7	96.6
13	34	3.4	3.4	100.0
TOTAL	996	100.0	100.0	



Valid Cases 996 Missing Cases 0

10 WEST

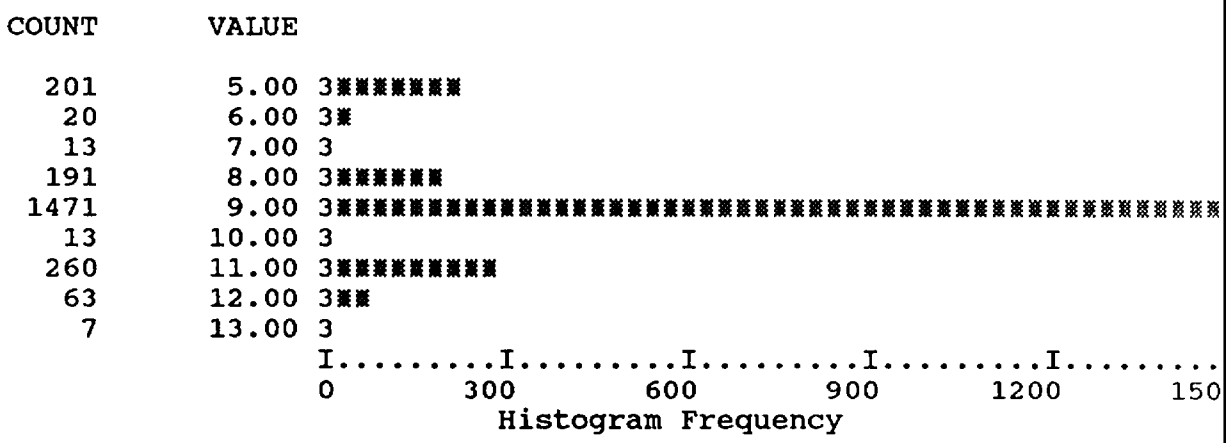
Value	Frequency	Percent	Valid Percent	Cum Percent
5	103	6.7	6.7	6.7
6	20	1.3	1.3	8.0
7	10	.7	.7	8.7
8	123	8.0	8.0	16.7
9	888	57.9	57.9	74.6
10	66	4.3	4.3	78.9
11	173	11.3	11.3	90.2
12	65	4.2	4.2	94.4
13	86	5.6	5.6	100.0
TOTAL	1534	100.0	100.0	



Valid Cases 1534 Missing Cases 0

11 EAST

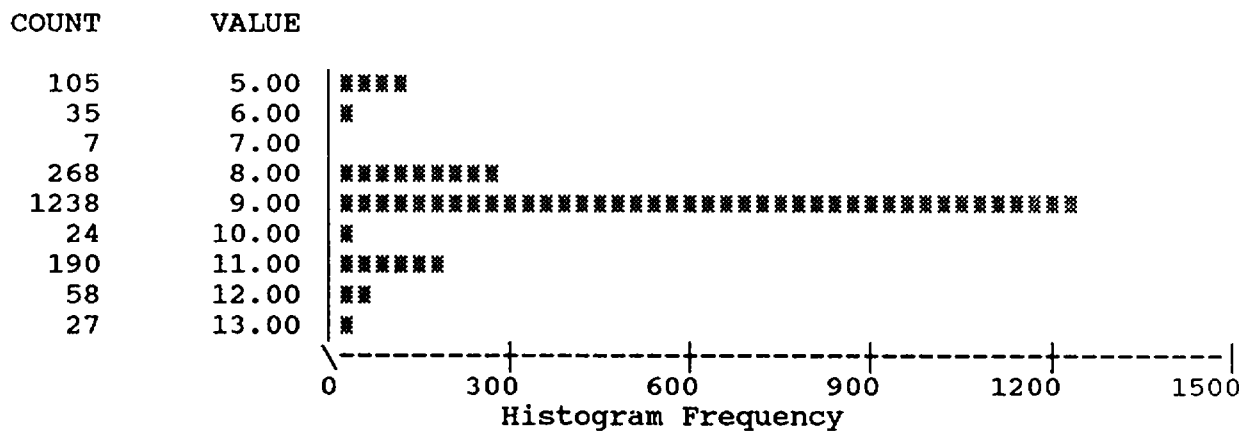
Value	Frequency	Percent	Valid Percent	Cum Percent
5	201	9.0	9.0	9.0
6	20	.9	.9	9.9
7	13	.6	.6	10.5
8	191	8.5	8.5	19.0
9	1471	65.7	65.7	84.7
10	13	.6	.6	85.3
11	260	11.6	11.6	96.9
12	63	2.8	2.8	99.7
13	7	.3	.3	100.0
TOTAL	2239	100.0	100.0	



Valid Cases 2239 Missing Cases 0

11 WEST

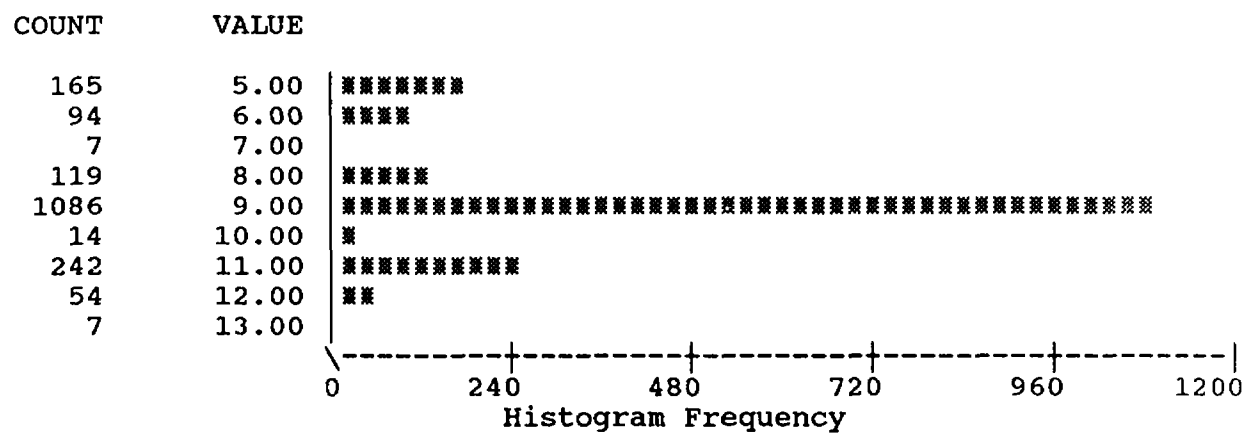
Value	Frequency	Percent	Valid Percent	Cum Percent
5	105	5.4	5.4	5.4
6	35	1.8	1.8	7.2
7	7	.4	.4	7.5
8	268	13.7	13.7	21.3
9	1238	63.4	63.4	84.7
10	24	1.2	1.2	85.9
11	190	9.7	9.7	95.6
12	58	3.0	3.0	98.6
13	27	1.4	1.4	100.0
TOTAL	1952	100.0	100.0	



Valid Cases 1952 Missing Cases 0

12 EAST

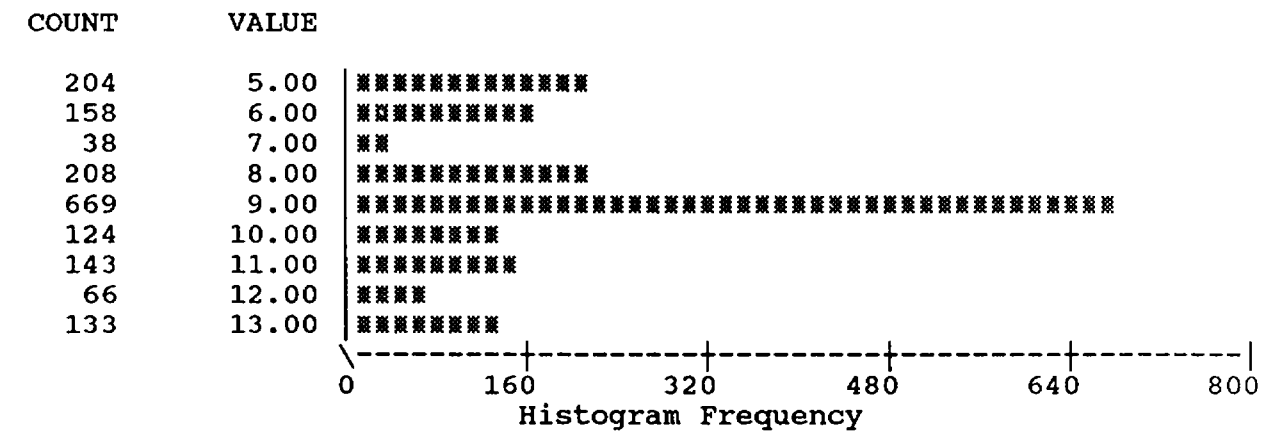
Value	Frequency	Percent	Valid Percent	Cum Percent
5	165	9.2	9.2	9.2
6	94	5.3	5.3	14.5
7	7	.4	.4	14.9
8	119	6.7	6.7	21.5
9	1086	60.7	60.7	82.3
10	14	.8	.8	83.1
11	242	13.5	13.5	96.6
12	54	3.0	3.0	99.6
13	7	.4	.4	100.0
TOTAL	1788	100.0	100.0	



Valid Cases 1788 Missing Cases 0

12 WEST

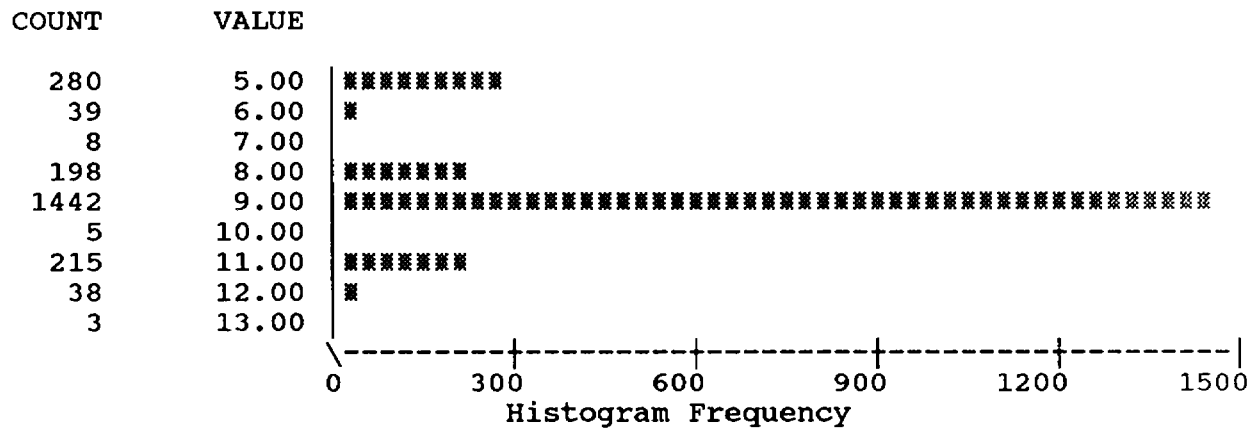
Value	Frequency	Percent	Valid Percent	Cum Percent
5	204	11.7	11.7	11.7
6	158	9.1	9.1	20.8
7	38	2.2	2.2	22.9
8	208	11.9	11.9	34.9
9	669	38.4	38.4	73.3
10	124	7.1	7.1	80.4
11	143	8.2	8.2	88.6
12	66	3.8	3.8	92.4
13	133	7.6	7.6	100.0
TOTAL	1743	100.0	100.0	



Valid Cases 1743 Missing Cases 0

13 EAST

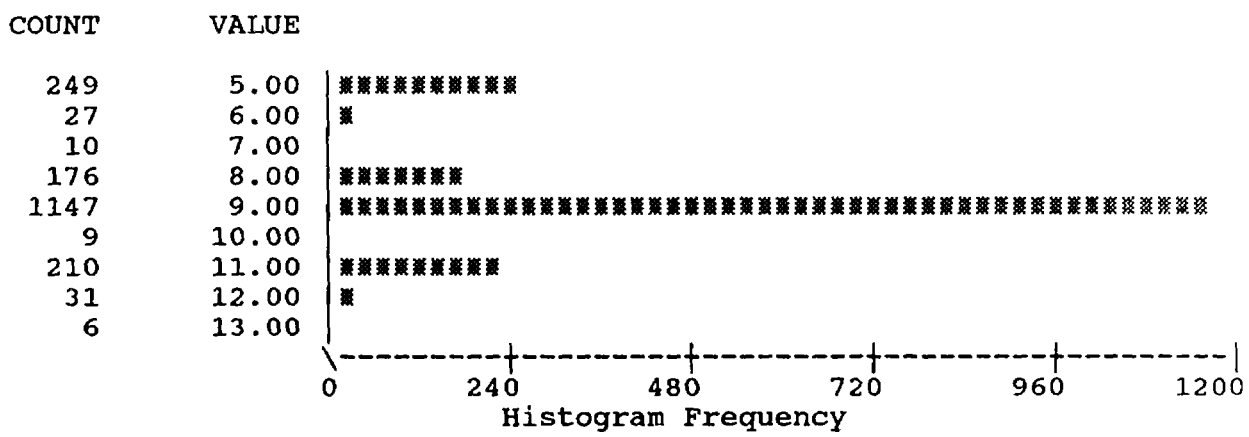
Value	Frequency	Percent	Valid Percent	Cum Percent
5	280	12.6	12.6	12.6
6	39	1.8	1.8	14.3
7	8	.4	.4	14.7
8	198	8.9	8.9	23.6
9	1442	64.7	64.7	88.3
10	5	.2	.2	88.5
11	215	9.6	9.6	98.2
12	38	1.7	1.7	99.9
13	3	.1	.1	100.0
TOTAL	2228	100.0	100.0	



Valid Cases 2228 Missing Cases 0

13 WEST

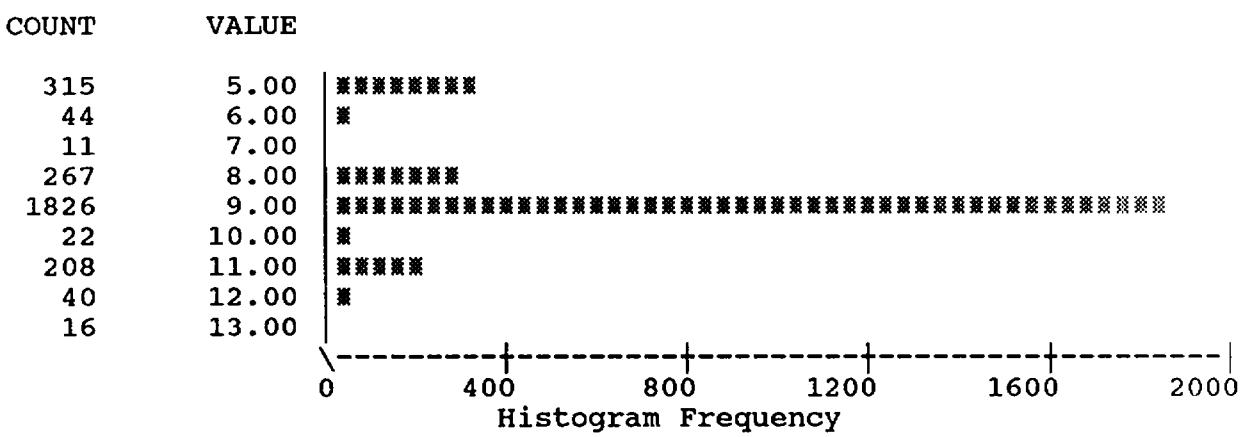
Value	Frequency	Percent	Valid Percent	Cum Percent
5	249	13.4	13.4	13.4
6	27	1.4	1.4	14.8
7	10	.5	.5	15.3
8	176	9.4	9.4	24.8
9	1147	61.5	61.5	86.3
10	9	.5	.5	86.8
11	210	11.3	11.3	98.0
12	31	1.7	1.7	99.7
13	6	.3	.3	100.0
TOTAL	1865	100.0	100.0	



Valid Cases 1865 Missing Cases 0

15 EAST

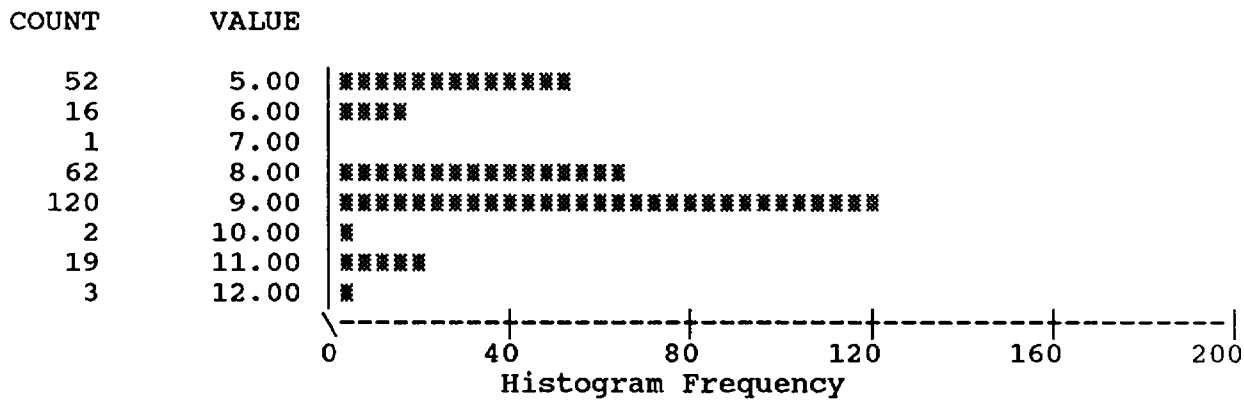
Value	Frequency	Percent	Valid Percent	Cum Percent
5	315	11.5	11.5	11.5
6	44	1.6	1.6	13.1
7	11	.4	.4	13.5
8	267	9.7	9.7	23.2
9	1826	66.4	66.4	89.6
10	22	.8	.8	90.4
11	208	7.6	7.6	98.0
12	40	1.5	1.5	99.4
13	16	.6	.6	100.0
TOTAL	2749	100.0	100.0	



Valid Cases 2749 Missing Cases 0

15 WEST

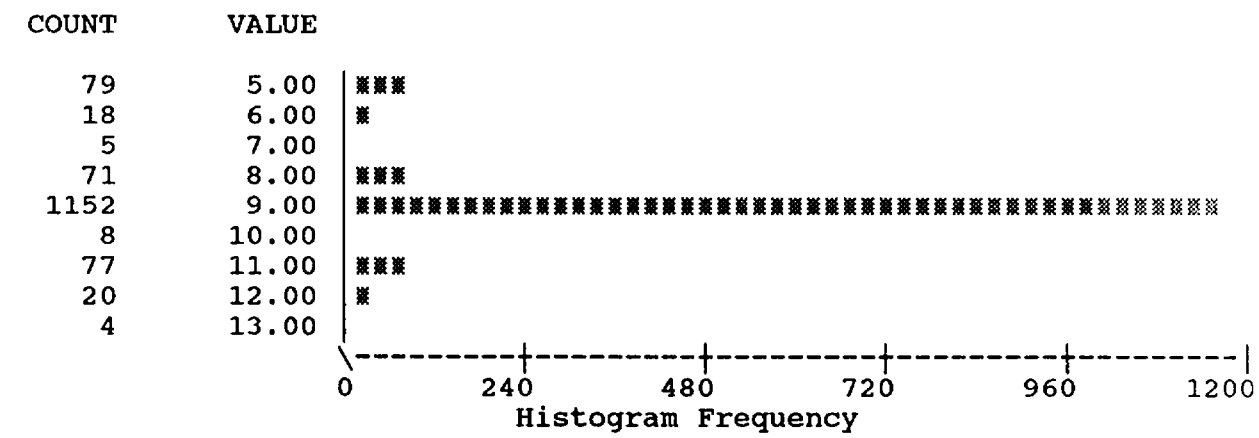
Value	Frequency	Percent	Valid Percent	Cum Percent
5	52	18.9	18.9	18.9
6	16	5.8	5.8	24.7
7	1	.4	.4	25.1
8	62	22.5	22.5	47.6
9	120	43.6	43.6	91.3
10	2	.7	.7	92.0
11	19	6.9	6.9	98.9
12	3	1.1	1.1	100.0
TOTAL	275	100.0	100.0	



Valid Cases 275 Missing Cases 0

18 EAST

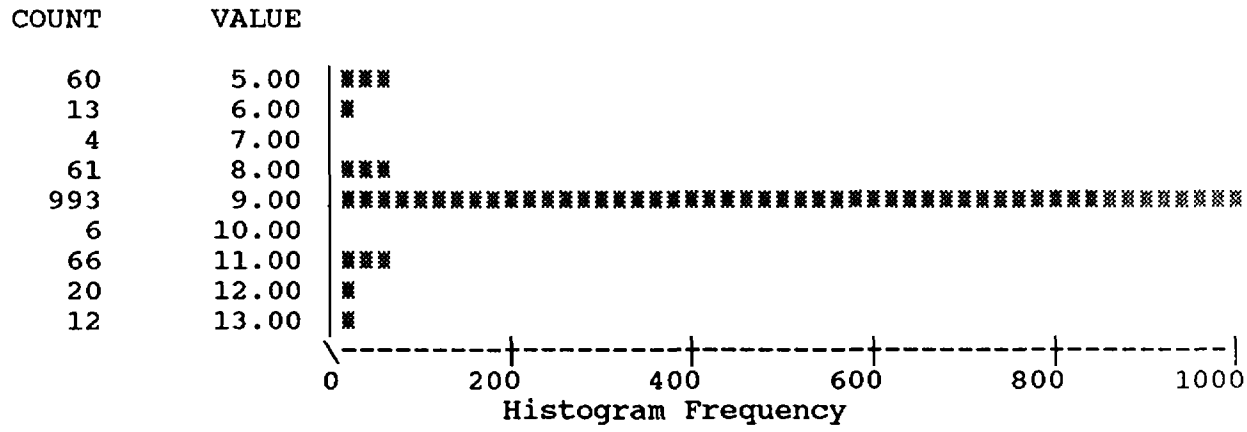
Value	Frequency	Percent	Valid Percent	Cum Percent
5	79	5.5	5.5	5.5
6	18	1.3	1.3	6.8
7	5	.3	.3	7.1
8	71	5.0	5.0	12.1
9	1152	80.3	80.3	92.4
10	8	.6	.6	93.0
11	77	5.4	5.4	98.3
12	20	1.4	1.4	99.7
13	4	.3	.3	100.0
TOTAL	1434	100.0	100.0	



Valid Cases 1434 Missing Cases 0

18 WEST

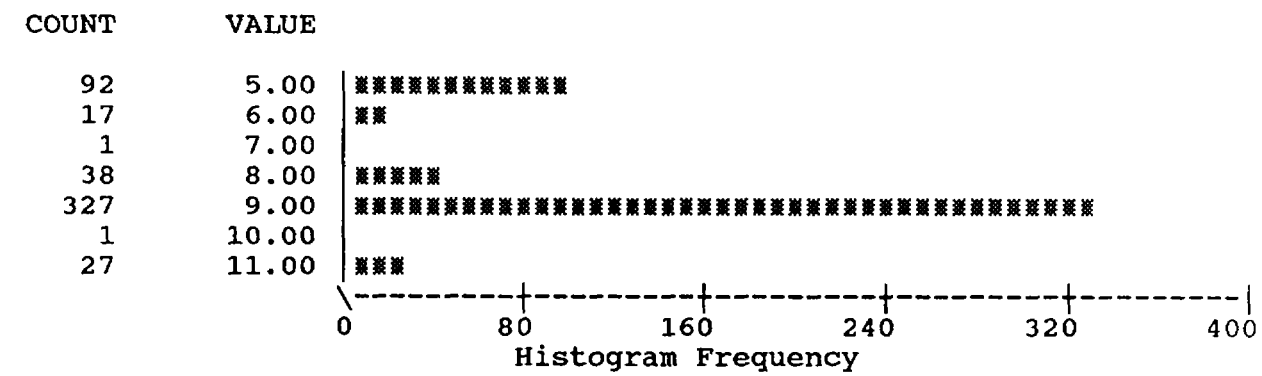
Value	Frequency	Percent	Valid Percent	Cum Percent
5	60	4.9	4.9	4.9
6	13	1.1	1.1	5.9
7	4	.3	.3	6.2
8	61	4.9	4.9	11.2
9	993	80.4	80.4	91.6
10	6	.5	.5	92.1
11	66	5.3	5.3	97.4
12	20	1.6	1.6	99.0
13	12	1.0	1.0	100.0
TOTAL	1235	100.0	100.0	



Valid Cases 1235 Missing Cases 0

19 NORTH

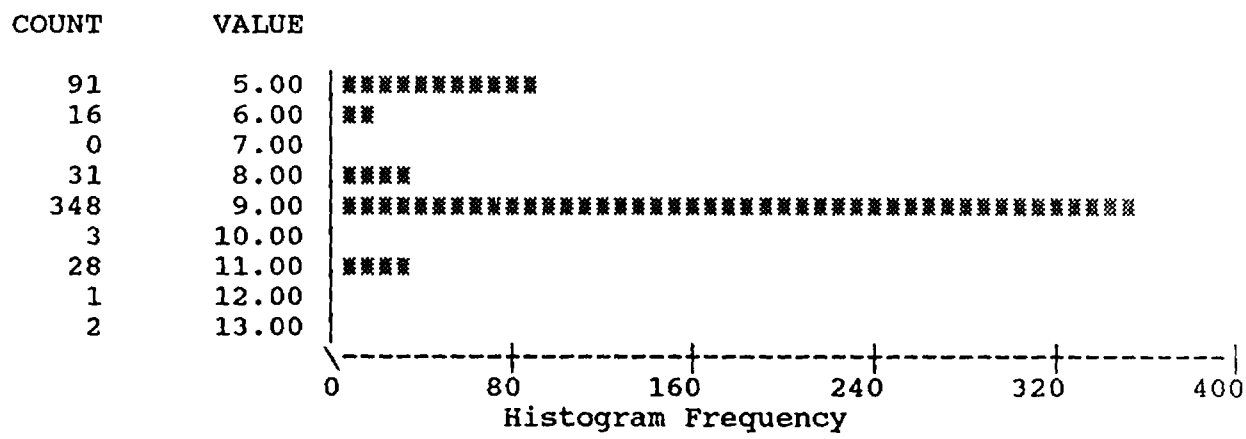
Value	Frequency	Percent	Valid Percent	Cum Percent
5	92	18.3	18.3	18.3
6	17	3.4	3.4	21.7
7	1	.2	.2	21.9
8	38	7.6	7.6	29.4
9	327	65.0	65.0	94.4
10	1	.2	.2	94.6
11	27	5.4	5.4	100.0
TOTAL	503	100.0	100.0	



Valid Cases 503 Missing Cases 0

19 SOUTH

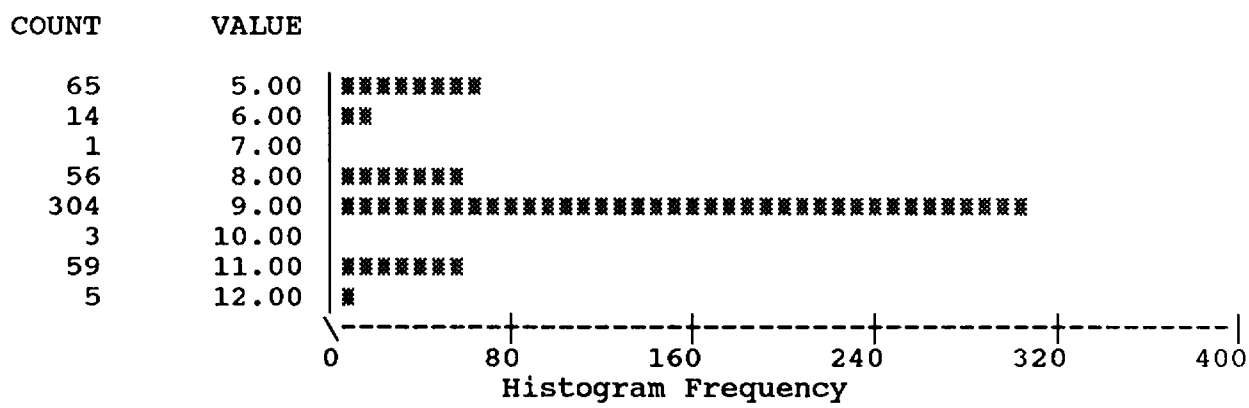
Value	Frequency	Percent	Valid Percent	Cum Percent
5	91	17.5	17.5	17.5
6	16	3.1	3.1	20.6
8	31	6.0	6.0	26.5
9	348	66.9	66.9	93.5
10	3	.6	.6	94.0
11	28	5.4	5.4	99.4
12	1	.2	.2	99.6
13	2	.4	.4	100.0
TOTAL	520	100.0	100.0	



Valid Cases 520 Missing Cases 0

20 EAST

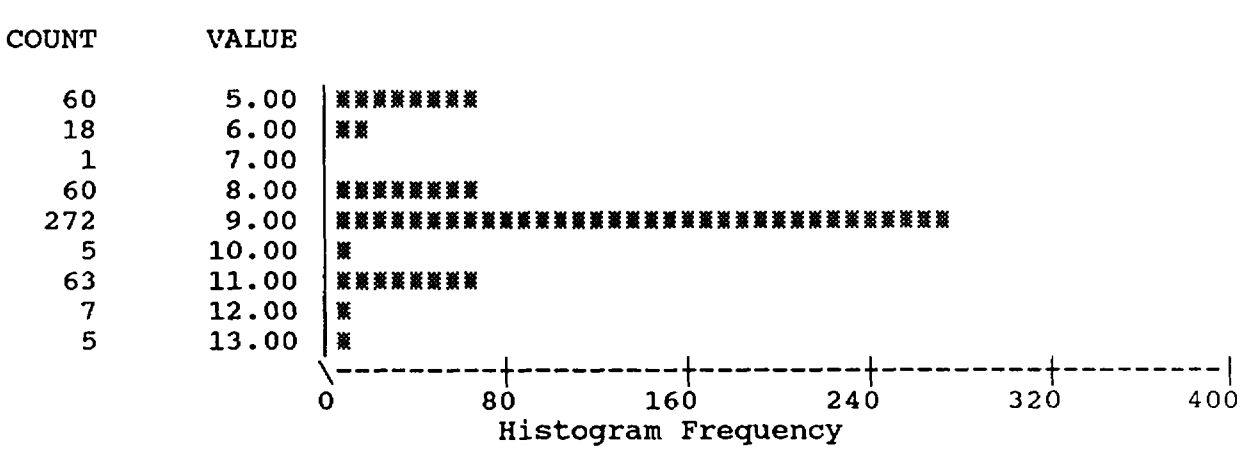
Value	Frequency	Percent	Valid Percent	Cum Percent
5	65	12.8	12.8	12.8
6	14	2.8	2.8	15.6
7	1	.2	.2	15.8
8	56	11.0	11.0	26.8
9	304	60.0	60.0	86.8
10	3	.6	.6	87.4
11	59	11.6	11.6	99.0
12	5	1.0	1.0	100.0
TOTAL	507	100.0	100.0	



Valid Cases 507 Missing Cases 0

20 WEST

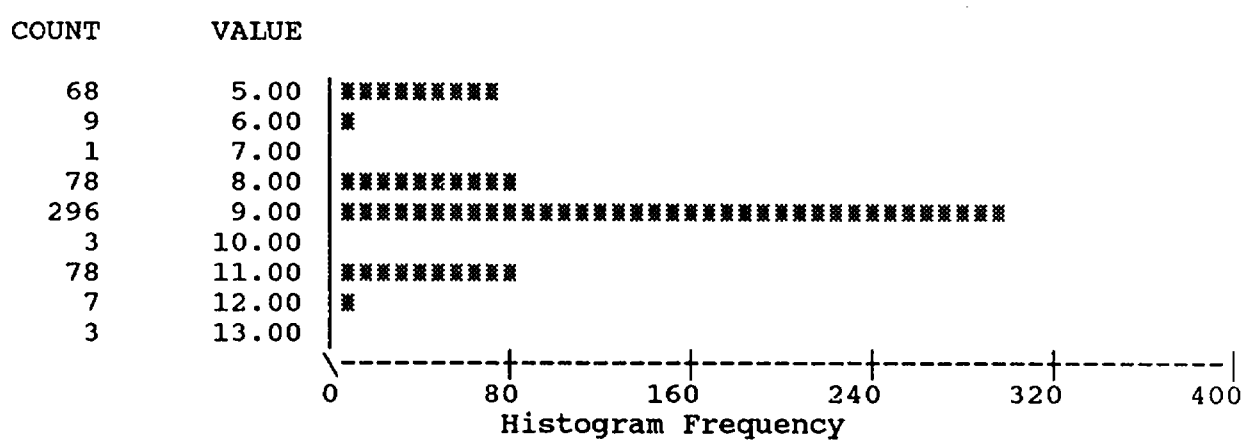
Value	Frequency	Percent	Valid Percent	Cum Percent
5	60	12.2	12.2	12.2
6	18	3.7	3.7	15.9
7	1	.2	.2	16.1
8	60	12.2	12.2	28.3
9	272	55.4	55.4	83.7
10	5	1.0	1.0	84.7
11	63	12.8	12.8	97.6
12	7	1.4	1.4	99.0
13	5	1.0	1.0	100.0
TOTAL	491	100.0	100.0	



Valid Cases 491 Missing Cases 0

22 EAST

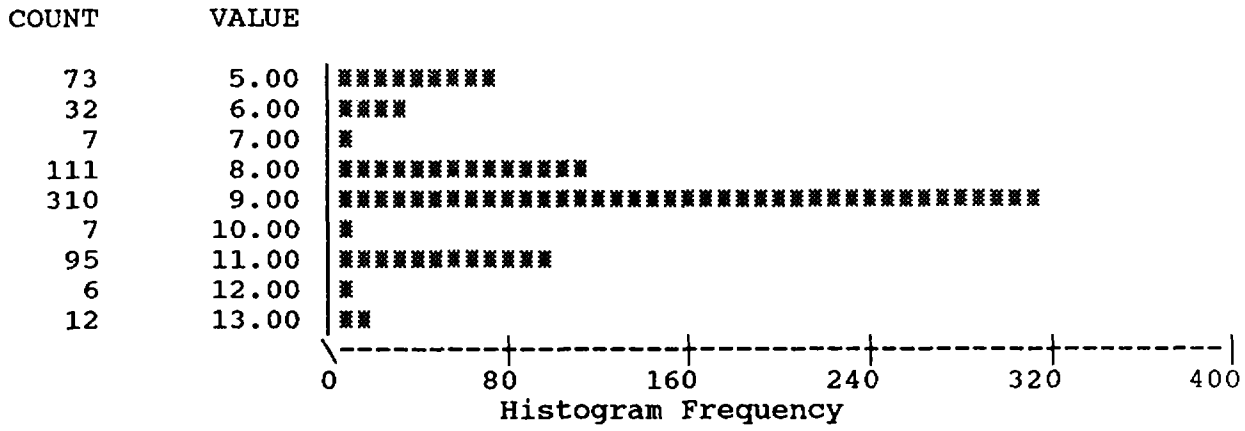
Value	Frequency	Percent	Valid Percent	Cum Percent
5	68	12.5	12.5	12.5
6	9	1.7	1.7	14.2
7	1	.2	.2	14.4
8	78	14.4	14.4	28.7
9	296	54.5	54.5	83.2
10	3	.6	.6	83.8
11	78	14.4	14.4	98.2
12	7	1.3	1.3	99.4
13	3	.6	.6	100.0
TOTAL	543	100.0	100.0	



Valid Cases 543 Missing Cases 0

22 WEST

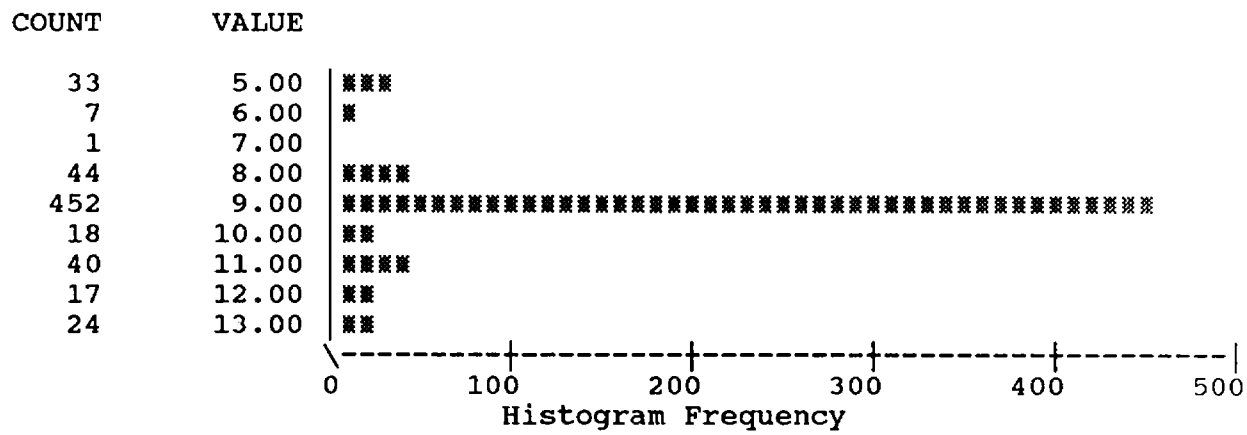
Value	Frequency	Percent	Valid Percent	Cum Percent
5	73	11.2	11.2	11.2
6	32	4.9	4.9	16.1
7	7	1.1	1.1	17.2
8	111	17.0	17.0	34.2
9	310	47.5	47.5	81.6
10	7	1.1	1.1	82.7
11	95	14.5	14.5	97.2
12	6	.9	.9	98.2
13	12	1.8	1.8	100.0
TOTAL	653	100.0	100.0	



Valid Cases 653 Missing Cases 0

23 EAST

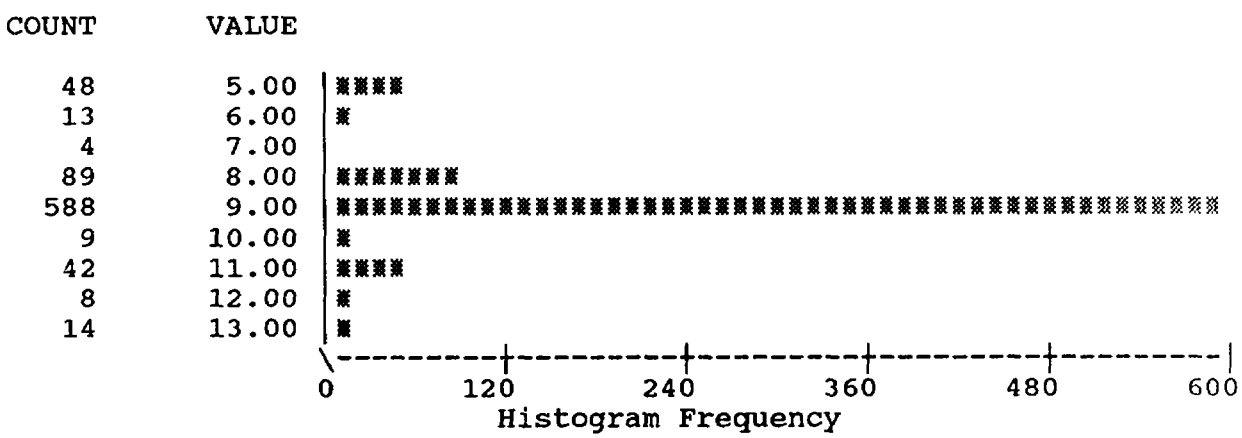
Value	Frequency	Percent	Valid Percent	Cum Percent
5	33	5.2	5.2	5.2
6	7	1.1	1.1	6.3
7	1	.2	.2	6.4
8	44	6.9	6.9	13.4
9	452	71.1	71.1	84.4
10	18	2.8	2.8	87.3
11	40	6.3	6.3	93.6
12	17	2.7	2.7	96.2
13	24	3.8	3.8	100.0
TOTAL	636	100.0	100.0	



Valid Cases 636 Missing Cases 0

23 WEST

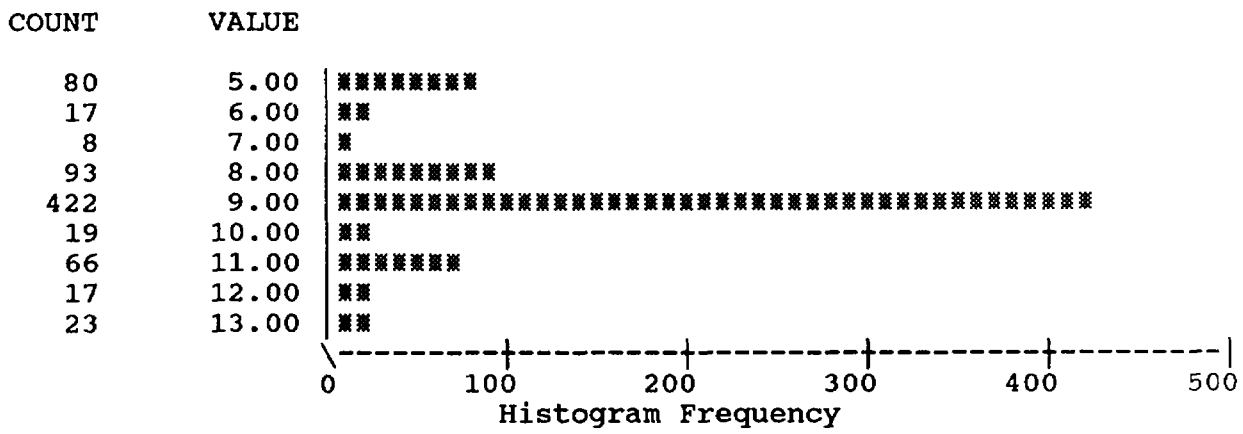
Value	Frequency	Percent	Valid Percent	Cum Percent
5	48	5.9	5.9	5.9
6	13	1.6	1.6	7.5
7	4	.5	.5	8.0
8	89	10.9	10.9	18.9
9	588	72.1	72.1	91.0
10	9	1.1	1.1	92.1
11	42	5.2	5.2	97.3
12	8	1.0	1.0	98.3
13	14	1.7	1.7	100.0
TOTAL	815	100.0	100.0	



Valid Cases 815 Missing Cases 0

24 NORTH

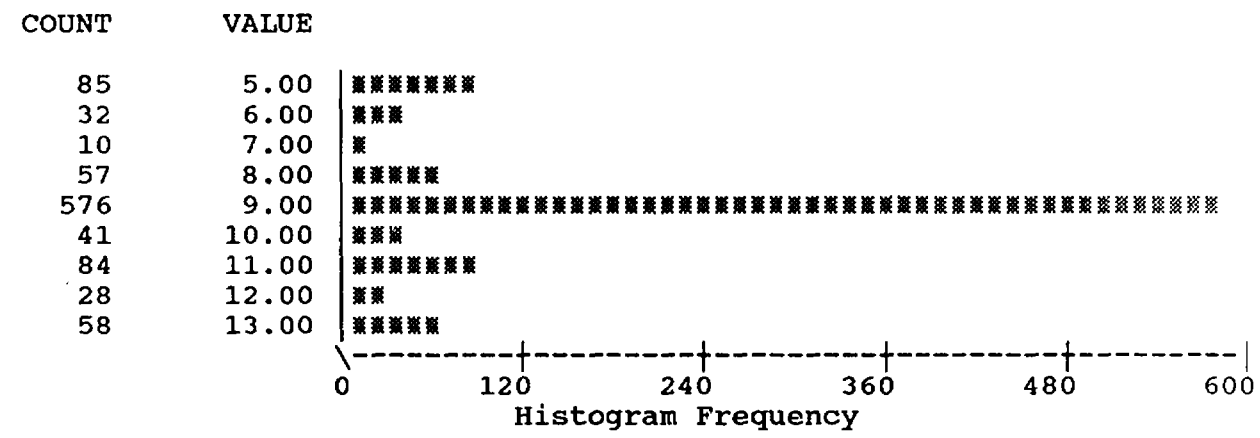
Value	Frequency	Percent	Valid Percent	Cum Percent
5	80	10.7	10.7	10.7
6	17	2.3	2.3	13.0
7	8	1.1	1.1	14.1
8	93	12.5	12.5	26.6
9	422	56.6	56.6	83.2
10	19	2.6	2.6	85.8
11	66	8.9	8.9	94.6
12	17	2.3	2.3	96.9
13	23	3.1	3.1	100.0
TOTAL	745	100.0	100.0	



Valid Cases 745 Missing Cases 0

24 SOUTH

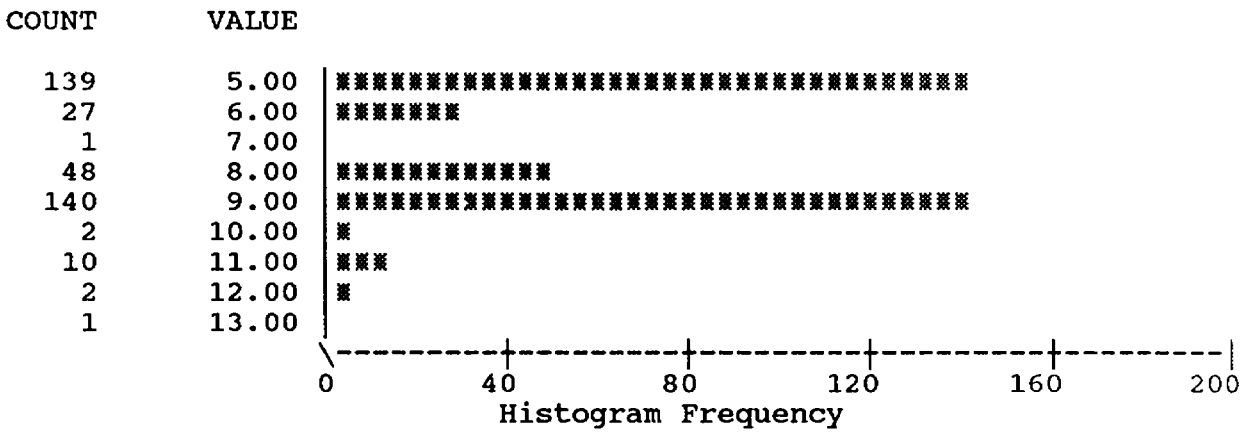
Value	Frequency	Percent	Valid Percent	Cum Percent
5	85	8.8	8.8	8.8
6	32	3.3	3.3	12.0
7	10	1.0	1.0	13.1
8	57	5.9	5.9	18.9
9	576	59.3	59.3	78.3
10	41	4.2	4.2	82.5
11	84	8.7	8.7	91.1
12	28	2.9	2.9	94.0
13	58	6.0	6.0	100.0
TOTAL	971	100.0	100.0	



Valid Cases 971 Missing Cases 0

25 EAST

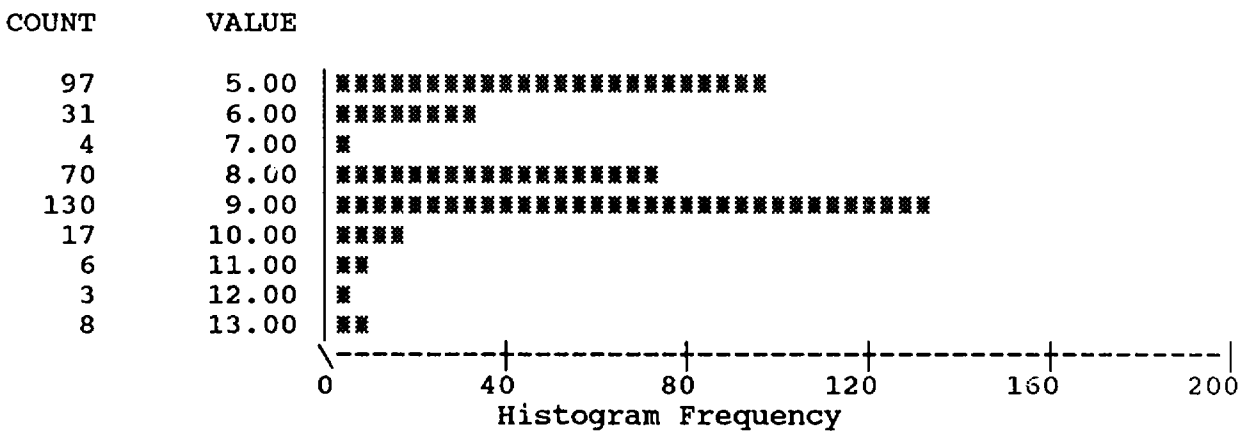
Value	Frequency	Percent	Valid Percent	Cum Percent
5	139	37.6	37.6	37.6
6	27	7.3	7.3	44.9
7	1	.3	.3	45.1
8	48	13.0	13.0	58.1
9	140	37.8	37.8	95.9
10	2	.5	.5	96.5
11	10	2.7	2.7	99.2
12	2	.5	.5	99.7
13	1	.3	.3	100.0
TOTAL	370	100.0	100.0	



Valid Cases 370 Missing Cases 0

25 WEST

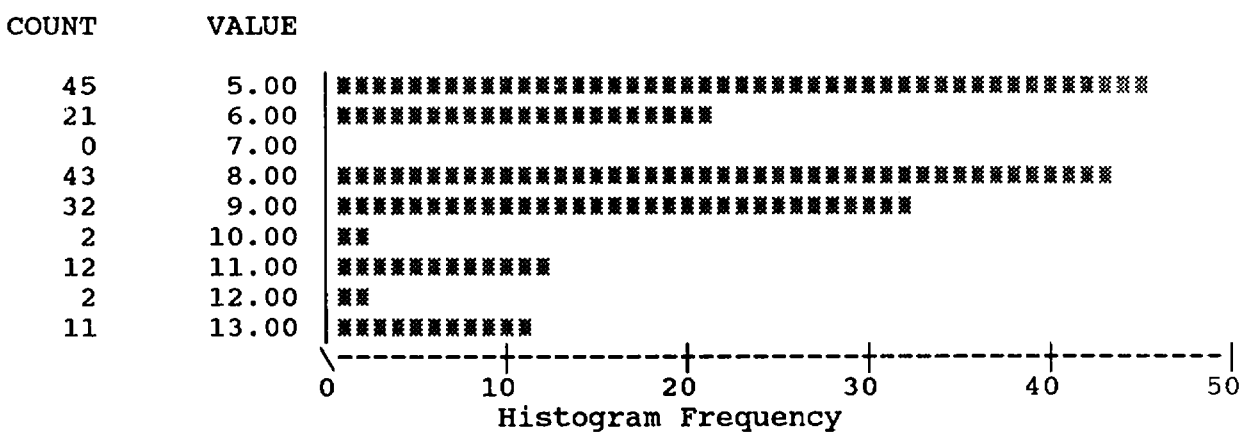
Value	Frequency	Percent	Valid Percent	Cum Percent
5	97	26.5	26.5	26.5
6	31	8.5	8.5	35.0
7	4	1.1	1.1	36.1
8	70	19.1	19.1	55.2
9	130	35.5	35.5	90.7
10	17	4.6	4.6	95.4
11	6	1.6	1.6	97.0
12	3	.8	.8	97.8
13	8	2.2	2.2	100.0
TOTAL	366	100.0	100.0	



Valid Cases 366 Missing Cases 0

26 NORTH

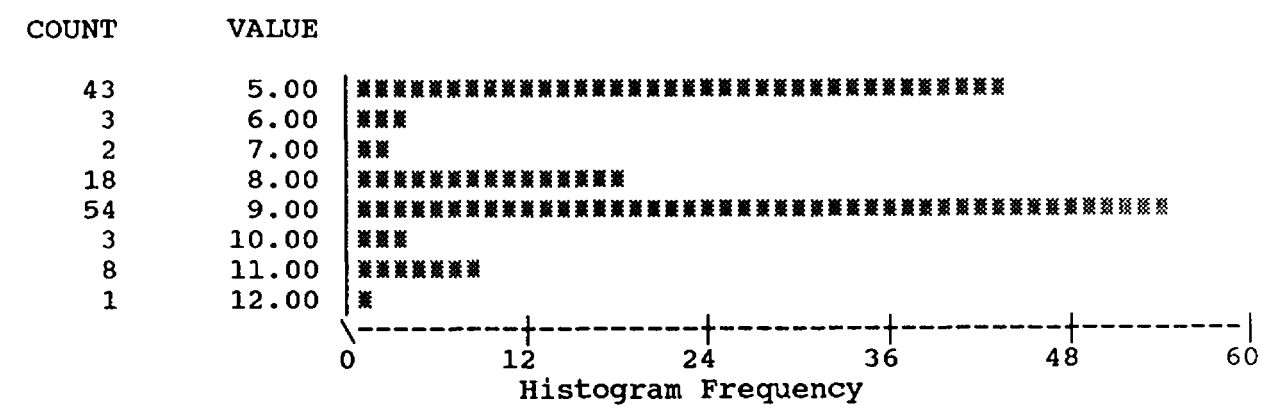
Value	Frequency	Percent	Valid Percent	Cum Percent
5	45	26.8	26.8	26.8
6	21	12.5	12.5	39.3
8	43	25.6	25.6	64.9
9	32	19.0	19.0	83.9
10	2	1.2	1.2	85.1
11	12	7.1	7.1	92.3
12	2	1.2	1.2	93.5
13	11	6.5	6.5	100.0
TOTAL	168	100.0	100.0	



Valid Cases 168 Missing Cases 0

26 SOUTH

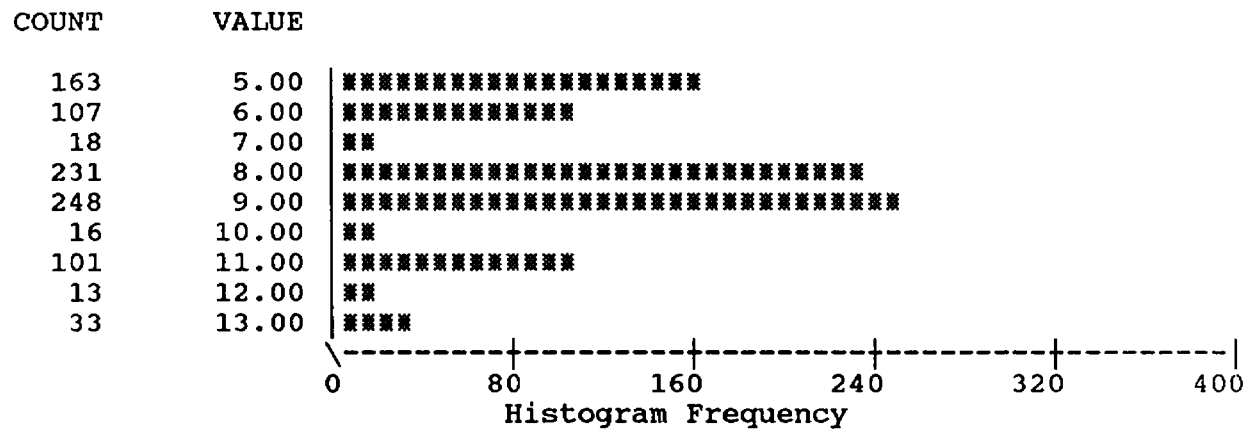
Value	Frequency	Percent	Valid Percent	Cum Percent
5	43	32.6	32.6	32.6
6	3	2.3	2.3	34.8
7	2	1.5	1.5	36.4
8	18	13.6	13.6	50.0
9	54	40.9	40.9	90.9
10	3	2.3	2.3	93.2
11	8	6.1	6.1	99.2
12	1	.8	.8	100.0
TOTAL	132	100.0	100.0	



Valid Cases 132 Missing Cases 0

27 NORTH

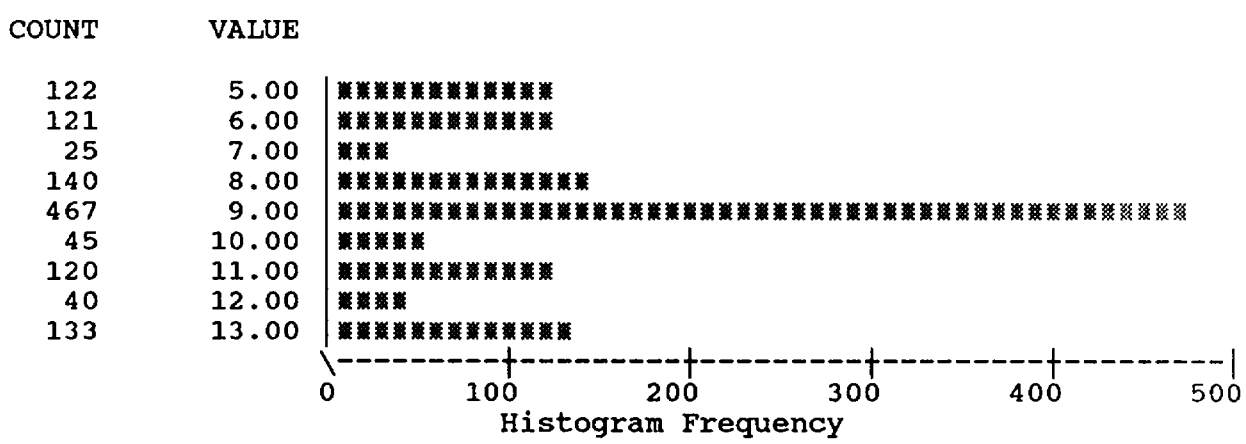
Value	Frequency	Percent	Valid Percent	Cum Percent
5	163	17.5	17.5	17.5
6	107	11.5	11.5	29.0
7	18	1.9	1.9	31.0
8	231	24.8	24.8	55.8
9	248	26.7	26.7	82.5
10	16	1.7	1.7	84.2
11	101	10.9	10.9	95.1
12	13	1.4	1.4	96.5
13	33	3.5	3.5	100.0
TOTAL	930	100.0	100.0	



Valid Cases 930 Missing Cases 0

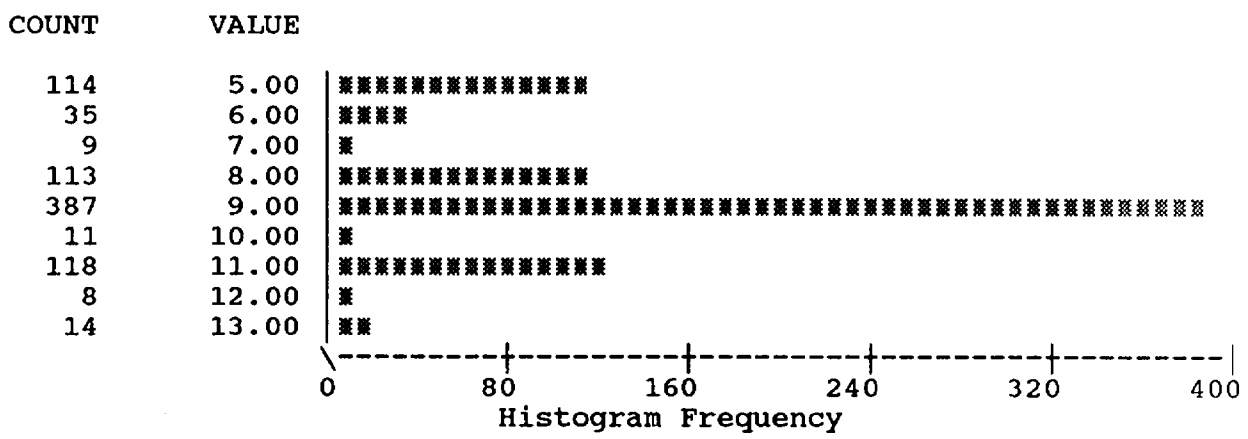
27 SOUTH

Value	Frequency	Percent	Valid Percent	Cum Percent
5	122	10.1	10.1	10.1
6	121	10.0	10.0	20.0
7	25	2.1	2.1	22.1
8	140	11.5	11.5	33.6
9	467	38.5	38.5	72.1
10	45	3.7	3.7	75.8
11	120	9.9	9.9	85.7
12	40	3.3	3.3	89.0
13	133	11.0	11.0	100.0
TOTAL	1213	100.0	100.0	



28 NORTH

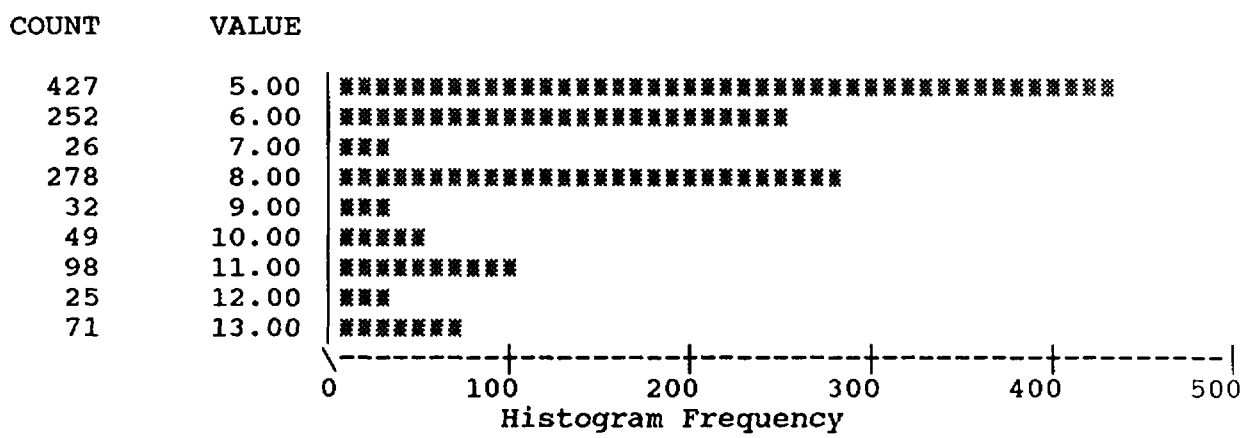
Value	Frequency	Percent	Valid Percent	Cum Percent
5	114	14.1	14.1	14.1
6	35	4.3	4.3	18.4
7	9	1.1	1.1	19.5
8	113	14.0	14.0	33.5
9	387	47.8	47.8	81.3
10	11	1.4	1.4	82.7
11	118	14.6	14.6	97.3
12	8	1.0	1.0	98.3
13	14	1.7	1.7	100.0
TOTAL	809	100.0	100.0	



Valid Cases 809 Missing Cases 0

28 SOUTH

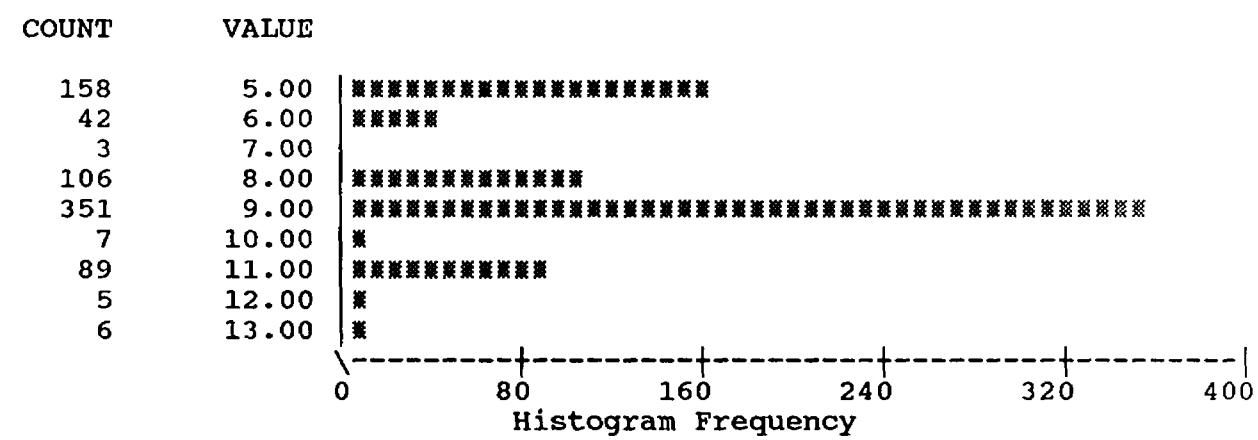
Value	Frequency	Percent	Valid Percent	Cum Percent
5	427	33.9	33.9	33.9
6	252	20.0	20.0	54.0
7	26	2.1	2.1	56.0
8	278	22.1	22.1	78.1
9	32	2.5	2.5	80.7
10	49	3.9	3.9	84.6
11	98	7.8	7.8	92.4
12	25	2.0	2.0	94.4
13	71	5.6	5.6	100.0
TOTAL	1258	100.0	100.0	



Valid Cases 1258 Missing Cases 0

29 NORTH

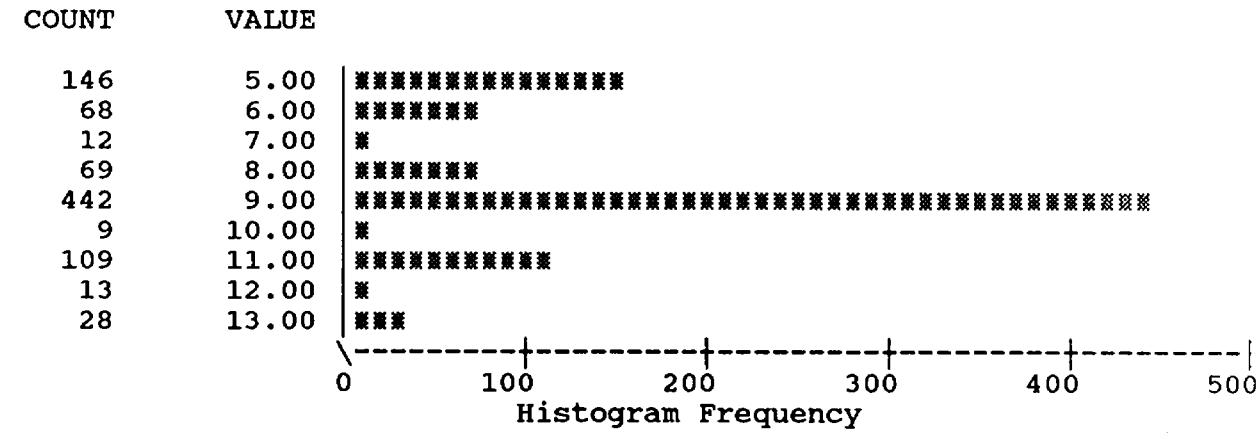
Value	Frequency	Percent	Valid Percent	Cum Percent
5	158	20.6	20.6	20.6
6	42	5.5	5.5	26.1
7	3	.4	.4	26.5
8	106	13.8	13.8	40.3
9	351	45.8	45.8	86.0
10	7	.9	.9	87.0
11	89	11.6	11.6	98.6
12	5	.7	.7	99.2
13	6	.8	.8	100.0
TOTAL	767	100.0	100.0	



Valid Cases 767 Missing Cases 0

29 SOUTH

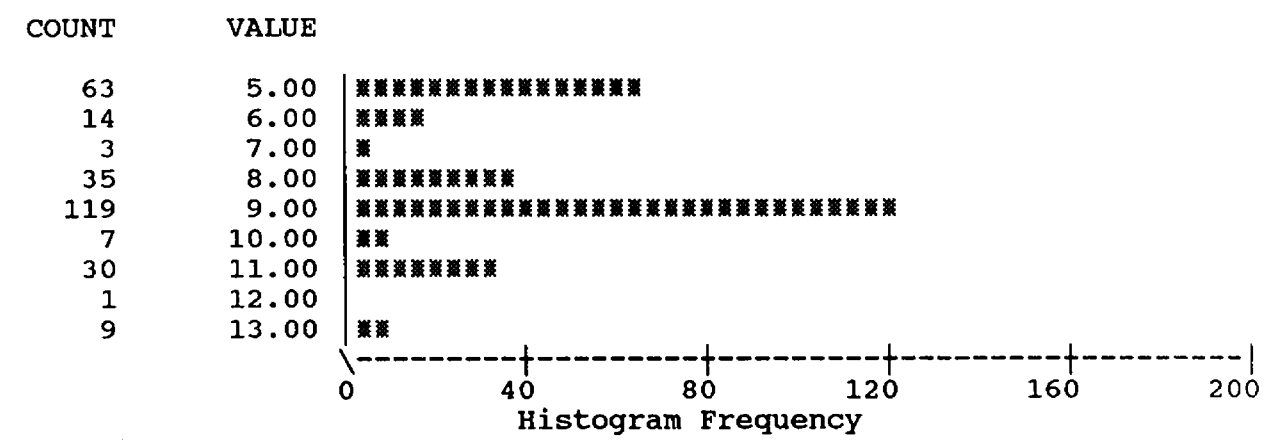
Value	Frequency	Percent	Valid Percent	Cum Percent
5	146	16.3	16.3	16.3
6	68	7.6	7.6	23.9
7	12	1.3	1.3	25.2
8	69	7.7	7.7	32.9
9	442	49.3	49.3	82.3
10	9	1.0	1.0	83.3
11	109	12.2	12.2	95.4
12	13	1.5	1.5	96.9
13	28	3.1	3.1	100.0
TOTAL	896	100.0	100.0	



Valid Cases 896 Missing Cases 0

30 NORTH

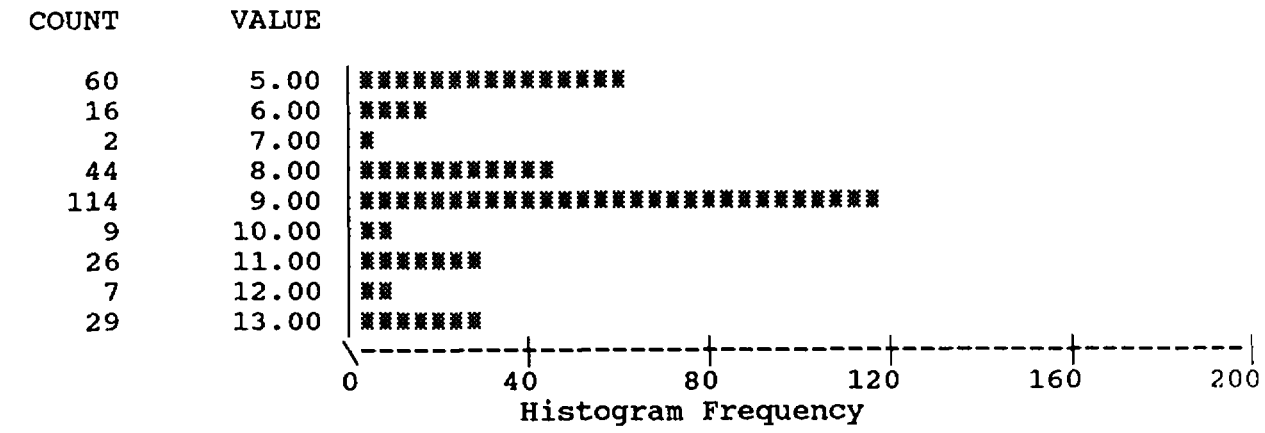
Value	Frequency	Percent	Valid Percent	Cum Percent
5	63	22.4	22.4	22.4
6	14	5.0	5.0	27.4
7	3	1.1	1.1	28.5
8	35	12.5	12.5	40.9
9	119	42.3	42.3	83.3
10	7	2.5	2.5	85.8
11	30	10.7	10.7	96.4
12	1	.4	.4	96.8
13	9	3.2	3.2	100.0
TOTAL	281	100.0	100.0	



Valid Cases 281 Missing Cases 0

30 SOUTH

Value	Frequency	Percent	Valid Percent	Cum Percent
5	60	19.5	19.5	19.5
6	16	5.2	5.2	24.8
7	2	.7	.7	25.4
8	44	14.3	14.3	39.7
9	114	37.1	37.1	76.9
10	9	2.9	2.9	79.8
11	26	8.5	8.5	88.3
12	7	2.3	2.3	90.6
13	29	9.4	9.4	100.0
TOTAL	307	100.0	100.0	



Valid Cases 307 Missing Cases 0

APPENDIX D
Automatic Traffic Recorder Data

ATR 1

DIR 1

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			9354.6311	4056.1504	732
DAY	1		6050.9038	2686.0102	104
DAY	2		9787.3269	3934.8863	104
DAY	3		10485.8750	3868.9027	104
DAY	4		10508.1250	3866.3997	104
DAY	5		10427.1250	4027.4399	104
DAY	6		10828.5283	4278.4244	106
DAY	7		7403.7075	2820.2941	106

Total Cases = 732

DIR 2

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			9501.1967	2508.3175	732
DAY	1		5737.8365	1818.7054	104
DAY	2		10132.2981	1921.3857	104
DAY	3		10868.2019	874.9857	104
DAY	4		10838.5288	750.9306	104
DAY	5		10814.9423	1303.3811	104
DAY	6		11071.9245	1589.4536	106
DAY	7		7061.3585	1784.4738	106

Total Cases = 732

DIR 1

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1634.0423	793.7934	732
DAY	1		1713.9519	1088.4322	104
DAY	2		1534.3558	835.9788	104
DAY	3		1436.8846	564.3750	104
DAY	4		1476.0288	672.7965	104
DAY	5		1552.4038	656.4619	104
DAY	6		1968.3679	906.9141	106
DAY	7		1747.6887	570.5207	106

Total Cases = 732

DIR 2

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1535.3320	487.0900	732
DAY	1		1635.4519	662.2824	104
DAY	2		1541.2500	384.0542	104
DAY	3		1324.0385	260.2726	104
DAY	4		1351.9519	423.1377	104
DAY	5		1459.1827	306.9471	104
DAY	6		1881.6604	608.8479	106
DAY	7		1546.9057	396.4179	106

Total Cases = 732

DIR 1

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1953.5396	594.8931	732
DAY	1		1779.6250	495.5859	104
DAY	2		1454.4038	498.7150	104
DAY	3		1878.4231	487.2383	104
DAY	4		2003.2115	472.1343	104
DAY	5		2010.2500	498.6813	104
DAY	6		2192.6415	675.6397	106
DAY	7		2344.1132	572.0682	106

Total Cases = 732

DIR 2

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2033.6421	677.0572	732
DAY	1		2767.0962	870.4689	104
DAY	2		2060.1154	574.3953	104
DAY	3		1800.4231	489.8130	104
DAY	4		1908.4038	538.1509	104
DAY	5		2015.6442	568.3388	104
DAY	6		1784.8962	480.3680	106
DAY	7		1906.1509	612.6001	106

Total Cases = 732

DIR 1

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			6478.0997	1858.8629	732
DAY	1		6514.2788	2532.5136	104
DAY	2		5672.5577	1428.7920	104
DAY	3		5824.3077	1063.8691	104
DAY	4		6133.9038	1284.7625	104
DAY	5		6228.2885	1253.4697	104
DAY	6		7468.8113	2423.5794	106
DAY	7		7466.4906	1547.2215	106

Total Cases = 732

DIR 2

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			6181.4795	1868.4374	732
DAY	1		7189.0769	2724.1280	104
DAY	2		5741.4327	1479.7364	104
DAY	3		5379.9038	1151.3162	104
DAY	4		5785.5962	1523.3723	104
DAY	5		6016.9038	1444.3129	104
DAY	6		6857.1226	2103.3474	106
DAY	7		6285.3302	1530.4543	106

Total Cases = 732

DIR 1

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2703.6434	803.3828	732
DAY	1		2344.0288	603.7457	104
DAY	2		2226.1731	606.1987	104
DAY	3		2627.8558	654.4462	104
DAY	4		2778.1250	714.0791	104
DAY	5		2797.9423	795.4230	104
DAY	6		3018.0283	985.1233	106
DAY	7		3119.3113	784.7235	106

Total Cases = 732

DIR 2

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2690.2623	939.1080	732
DAY	1		3182.1827	1239.5466	104
DAY	2		2663.5192	833.8602	104
DAY	3		2522.8942	763.4584	104
DAY	4		2580.9808	874.8107	104
DAY	5		2745.8750	947.4870	104
DAY	6		2535.7358	793.1956	106
DAY	7		2605.2547	896.5932	106

Total Cases = 732

DIR 1

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			4543.9740	1198.9199	732
DAY	1		4244.7981	1038.5754	104
DAY	2		3844.8750	846.3556	104
DAY	3		4183.9615	798.4231	104
DAY	4		4399.5769	928.4585	104
DAY	5		4472.9038	909.1945	104
DAY	6		5111.5943	1535.5603	106
DAY	7		5520.4151	1261.7458	106

Total Cases = 732

DIR 2

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			4474.3115	1178.3898	732
DAY	1		5192.0769	1899.5740	104
DAY	2		4308.5385	983.8983	104
DAY	3		4051.7308	802.1326	104
DAY	4		4217.0385	914.6282	104
DAY	5		4355.5385	851.0923	104
DAY	6		4539.8585	1108.1389	106
DAY	7		4650.7453	978.8151	106

Total Cases = 732

DIR 1

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			3512.0751	1215.9002	732
DAY	1		3167.8462	1061.6018	104
DAY	2		3454.2115	1152.4526	104
DAY	3		3399.5962	1129.5147	104
DAY	4		3533.6731	1262.6664	104
DAY	5		3371.7019	1129.0408	104
DAY	6		3832.1698	1421.0024	106
DAY	7		3813.3774	1204.4727	106

Total Cases = 732

DIR 2

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			3480.2568	864.0390	732
DAY	1		3189.3846	889.2022	104
DAY	2		3459.1538	714.6384	104
DAY	3		3341.6250	689.2445	104
DAY	4		3470.5865	757.4482	104
DAY	5		3318.0288	680.0877	104
DAY	6		3791.8774	1008.8168	106
DAY	7		3779.3962	1050.1750	106

Total Cases = 732

DIR 1

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5462.5519	2340.9855	732
DAY	1		5982.3365	1450.3488	104
DAY	2		4506.0673	1016.7081	104
DAY	3		4109.9519	682.1566	104
DAY	4		4264.1058	1107.7628	104
DAY	5		4722.0000	1333.0872	104
DAY	6		7253.5755	3869.5620	106
DAY	7		7329.4811	2233.7577	106

Total Cases = 732

DIR 2

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5285.1339	3182.5730	732
DAY	1		8187.4327	5634.4505	104
DAY	2		5009.6635	3136.5514	104
DAY	3		4084.2115	1234.6916	104
DAY	4		4135.6154	1385.9580	104
DAY	5		4377.7596	1382.8116	104
DAY	6		5322.4717	2155.2627	106
DAY	7		5866.8774	2740.0580	106

Total Cases = 732

DIR 1

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			32357.4495	9599.3543	732
DAY	1		22643.1154	9847.9757	104
DAY	2		33275.6538	8218.6194	104
DAY	3		34472.5096	7747.2459	104
DAY	4		35377.8365	7563.6556	104
DAY	5		35655.9808	7564.1904	104
DAY	6		36515.5566	9785.7663	106
DAY	7		28554.6604	7914.7184	106

Total Cases = 732

DIR 2

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			34699.9385	7571.6383	732
DAY	1		24082.6635	7714.8101	104
DAY	2		35492.0385	5520.7916	104
DAY	3		37500.4615	2815.8633	104
DAY	4		37852.5192	3733.1955	104
DAY	5		38476.3750	3868.6107	104
DAY	6		39720.0189	6694.2701	106
DAY	7		29773.6887	5995.3671	106

Total Cases = 732

DIR 1

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2664.1066	1008.3811	732
DAY	1		2468.5481	926.6331	104
DAY	2		2174.2115	896.2346	104
DAY	3		2486.5288	977.4300	104
DAY	4		2720.1442	928.1355	104
DAY	5		2757.0000	938.2869	104
DAY	6		2865.3208	1074.6915	106
DAY	7		3163.5189	1018.3045	106

Total Cases = 732

DIR 2

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2818.0956	784.4047	732
DAY	1		3517.1827	807.4901	104
DAY	2		2795.6058	804.2547	104
DAY	3		2517.8654	675.3556	104
DAY	4		2674.2788	654.1016	104
DAY	5		2767.7115	667.9640	104
DAY	6		2553.3302	643.9055	106
DAY	7		2904.1321	784.2004	106

Total Cases = 732

DIR 1

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2968.7787	1063.8063	732
DAY	1		2822.2308	1418.0230	104
DAY	2		2503.1058	1101.2198	104
DAY	3		2675.9712	631.0553	104
DAY	4		2863.0481	895.5663	104
DAY	5		2980.0865	901.3001	104
DAY	6		3508.0943	1094.8906	106
DAY	7		3410.0566	849.2051	106

Total Cases = 732

DIR 2

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2906.4932	838.9953	732
DAY	1		3462.0096	1301.2565	104
DAY	2		3121.0192	753.7659	104
DAY	3		2562.2115	551.0513	104
DAY	4		2660.7019	707.4693	104
DAY	5		2884.9135	574.6312	104
DAY	6		3099.0849	708.8331	106
DAY	7		2558.5000	615.1183	106

Total Cases = 732

DIR 1

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2846.3060	1046.5607	732
DAY	1		2280.5577	969.6639	104
DAY	2		2859.5673	874.2747	104
DAY	3		2799.2885	837.2480	104
DAY	4		3040.0481	1441.0956	104
DAY	5		2854.7404	850.6749	104
DAY	6		3317.1132	1174.6277	106
DAY	7		2765.3302	742.7603	106

Total Cases = 732

DIR 2

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2748.9440	1336.8975	732
DAY	1		2372.0769	872.7248	104
DAY	2		2754.8462	710.8513	104
DAY	3		2618.9519	716.6461	104
DAY	4		2675.3462	778.4978	104
DAY	5		3079.9231	2932.9502	104
DAY	6		3113.1132	909.2320	106
DAY	7		2623.7547	644.8015	106

Total Cases = 732

DIR 1

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2228.3019	1120.3573	732
DAY	1		2461.5673	1447.7296	104
DAY	2		2073.2596	968.7781	104
DAY	3		2051.4038	909.8991	104
DAY	4		2071.5096	923.4595	104
DAY	5		2069.3846	925.1959	104
DAY	6		2287.2264	1122.2614	106
DAY	7		2575.9434	1315.4946	106

Total Cases = 732

DIR 2

Summaries of ADT
By levels of DAY

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2311.5997	650.2068	732
DAY	1		2259.9615	738.8045	104
DAY	2		2044.0865	439.3685	104
DAY	3		2097.1827	440.9303	104
DAY	4		2162.7981	495.4591	104
DAY	5		2181.7500	507.3355	104
DAY	6		2547.3774	752.0155	106
DAY	7		2872.7170	661.2689	106

Total Cases = 732

APPENDIX E
Descriptive Statistics for Individual Sites

1 NORTH

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			41358.7958	26068.4500	475
CLASS	5		11715.0000	5219.0578	80
CLASS	6		9984.0000	7622.0766	11
CLASS	7		22550.0000	8053.2622	6
CLASS	8		19321.5000	11398.7663	64
CLASS	9		56365.6364	21109.8870	242
CLASS	10		41619.6000	23182.9524	10
CLASS	11		50259.0000	19795.8353	36
CLASS	12		69009.6000	22670.8607	5
CLASS	13		48356.0000	17791.1975	21

Total Cases = 475

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			6046.9895	1898.4809	475
CLASS	5		4225.6500	1424.0851	80
CLASS	6		3720.0000	1444.5628	11
CLASS	7		5236.0000	2847.8573	6
CLASS	8		4419.9375	1429.4423	64
CLASS	9		7040.7273	1416.5434	242
CLASS	10		6613.2000	942.5659	10
CLASS	11		6149.0000	1389.2289	36
CLASS	12		7128.0000	786.4808	5
CLASS	13		7241.1429	994.2025	21

Total Cases = 475

1 SOUTH

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			37466.5946	25367.6362	370
CLASS	5		10348.3810	4057.3451	63
CLASS	6		12434.4000	8082.7311	15
CLASS	7		24061.7143	9977.0563	7
CLASS	8		16556.5714	8523.7508	70
CLASS	9		56623.4743	19536.7991	175
CLASS	10		45764.4000	16079.8239	10
CLASS	11		42710.6087	13667.5105	23
CLASS	12		52976.0000	21985.9595	3
CLASS	13		47190.0000	24891.3643	4

Total Cases = 370

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5310.6811	1687.6013	370
CLASS	5		3922.2857	965.7670	63
CLASS	6		4056.8000	2148.4954	15
CLASS	7		6015.4286	3023.4024	7
CLASS	8		3797.8286	1003.3136	70
CLASS	9		6382.0114	1143.9301	175
CLASS	10		6613.2000	1325.0503	10
CLASS	11		5475.1304	948.4226	23
CLASS	12		5852.0000	898.5054	3
CLASS	13		5643.0000	1895.7057	4

Total Cases = 370

2 EAST

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			49453.5281	21880.4733	1068
CLASS	5		10101.2195	3945.7000	82
CLASS	6		8748.6667	5260.9042	18
CLASS	7		19470.0000	5506.9476	2
CLASS	8		15965.7143	6884.7932	84
CLASS	9		57155.8042	15221.6824	674
CLASS	10		69576.0000	11652.3114	11
CLASS	11		55802.7925	13536.8955	159
CLASS	12		58537.6000	15961.5446	15
CLASS	13		61368.5217	18045.5904	23

Total Cases = 1068

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5635.9551	1268.0952	1068
CLASS	5		3898.8293	750.7830	82
CLASS	6		2948.0000	1399.8884	18
CLASS	7		4224.0000	1493.4095	2
CLASS	8		3832.7143	965.3220	84
CLASS	9		6116.4570	917.5265	674
CLASS	10		6864.0000	739.6713	11
CLASS	11		5517.4340	848.1794	159
CLASS	12		6054.4000	856.7177	15
CLASS	13		6519.6522	727.0783	23

Total Cases = 1068

2 WEST

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			66679.5663	57127.0432	1425
CLASS	5		32726.1504	37814.7595	113
CLASS	6		42332.7470	42700.3320	83
CLASS	7		70104.0000	66277.9330	36
CLASS	8		69896.0511	60687.1089	509
CLASS	9		60002.7798	32453.0664	327
CLASS	10		80942.5200	60038.2946	75
CLASS	11		82615.1786	62713.4951	168
CLASS	12		96173.2895	80574.3710	38
CLASS	13		85267.6579	80730.6636	76

Total Cases = 1425

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			12147.2618	17577.0982	1425
CLASS	5		12180.0265	19078.3331	113
CLASS	6		10743.2771	18069.8633	83
CLASS	7		14237.0000	24481.8268	36
CLASS	8		15431.7741	21436.9367	509
CLASS	9		7408.9541	6621.7163	327
CLASS	10		11379.4800	13307.0476	75
CLASS	11		13146.9643	17393.7243	168
CLASS	12		12665.1316	17688.1735	38
CLASS	13		9320.4474	13906.0447	76

Total Cases = 1425

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			48382.7086	21473.9735	1654
CLASS	5		10285.2245	3936.4637	98
CLASS	6		15488.0000	11698.1227	24
CLASS	7		22387.2000	7685.3277	10
CLASS	8		17764.6154	9592.2924	143
CLASS	9		55879.2584	16475.3285	1068
CLASS	10		43924.0000	15099.1510	33
CLASS	11		53845.5446	16472.0784	202
CLASS	12		56014.8387	13204.8632	31
CLASS	13		47540.5333	14886.3144	45

Total Cases = 1654

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5982.5369	1421.8290	1654
CLASS	5		3779.5102	809.8053	98
CLASS	6		4939.0000	3755.5589	24
CLASS	7		6124.8000	2417.3586	10
CLASS	8		4115.0769	1517.6414	143
CLASS	9		6436.1124	959.8410	1068
CLASS	10		6856.0000	981.6817	33
CLASS	11		5719.7822	1036.2274	202
CLASS	12		6259.3548	879.4108	31
CLASS	13		6822.9333	790.4095	45

Total Cases = 1654

3 WEST

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			68998.6478	47575.0163	1735
CLASS	5		38814.0603	41342.9147	199
CLASS	6		65563.8000	57769.7045	75
CLASS	7		79731.5294	59028.6386	17
CLASS	8		79619.2556	60046.6576	399
CLASS	9		67494.6000	28198.4281	805
CLASS	10		155140.412	110177.758	17
CLASS	11		74922.8108	48539.8484	185
CLASS	12		85997.0000	70804.1542	18
CLASS	13		78432.3000	81322.5079	20

Total Cases = 1735

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			12744.8375	18116.3341	1735
CLASS	5		15753.5980	22968.4957	199
CLASS	6		18286.0533	26687.2081	75
CLASS	7		18127.0000	27387.3362	17
CLASS	8		18576.4411	24333.1201	399
CLASS	9		8655.2696	8827.1870	805
CLASS	10		34690.7647	35089.7101	17
CLASS	11		10401.1243	13473.5629	185
CLASS	12		14018.5000	16756.0685	18
CLASS	13		7596.9000	11168.9376	20

Total Cases = 1735

5 EAST

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			88817.8677	47745.7358	1587
CLASS	5		46368.2256	29941.0494	266
CLASS	6		68120.5468	35241.6613	139
CLASS	7		88977.0000	39216.4931	44
CLASS	8		88193.0935	39371.8872	695
CLASS	9		112002.000	42859.8686	104
CLASS	10		141491.514	54007.4257	74
CLASS	11		115743.580	46034.0773	181
CLASS	12		126723.771	44672.9869	35
CLASS	13		131399.265	54485.7953	49

Total Cases = 1587

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			20915.8034	19031.9527	1587
CLASS	5		20116.6015	19232.0511	266
CLASS	6		18430.6187	17935.3747	139
CLASS	7		22572.0000	18169.0031	44
CLASS	8		22867.9079	19615.5271	695
CLASS	9		17058.4615	17614.0819	104
CLASS	10		20251.2973	18253.2663	74
CLASS	11		19957.5249	18351.9517	181
CLASS	12		14206.9714	12501.1607	35
CLASS	13		20651.2653	21165.8762	49

Total Cases = 1587

5 WEST

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			45965.6750	21303.9030	1717
CLASS	5		10731.6000	4516.2166	120
CLASS	6		16479.1579	6393.7489	38
CLASS	7		21252.0000	5259.0585	7
CLASS	8		16912.2857	9695.4034	154
CLASS	9		53275.4740	16328.1399	1156
CLASS	10		44191.7143	21470.9569	14
CLASS	11		52568.4469	15524.2780	179
CLASS	12		56975.1111	16949.3088	27
CLASS	13		50118.0000	17578.4765	22

Total Cases = 1717

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5551.5341	1336.8327	1717
CLASS	5		3931.4000	973.7919	120
CLASS	6		4866.6316	1921.7459	38
CLASS	7		4563.4286	1439.6619	7
CLASS	8		4043.1429	2025.3472	154
CLASS	9		5934.9758	958.3282	1156
CLASS	10		5751.4286	1100.3964	14
CLASS	11		5594.8827	1069.2834	179
CLASS	12		5514.6667	940.7709	27
CLASS	13		5862.0000	727.1809	22

Total Cases = 1717

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			66645.2505	30520.3423	1445
CLASS	5		13956.2705	6846.7987	122
CLASS	6		26259.3714	20189.0518	35
CLASS	7		30379.5000	9608.7518	8
CLASS	8		25733.0476	17189.7838	105
CLASS	9		78864.5207	21926.3162	895
CLASS	10		66113.8214	24096.0133	28
CLASS	11		70068.4803	22263.9581	152
CLASS	12		78103.7619	19579.5702	42
CLASS	13		75343.7586	23226.7987	58

Total Cases = 1445

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			7894.2208	2572.8108	1445
CLASS	5		4504.0984	1397.2821	122
CLASS	6		6091.6000	3814.6192	35
CLASS	7		6986.5000	2613.6745	8
CLASS	8		5170.5333	3133.8246	105
CLASS	9		8626.7553	2056.9627	895
CLASS	10		8993.8571	2571.5704	28
CLASS	11		7713.6579	1415.0992	152
CLASS	12		8455.5714	1658.4793	42
CLASS	13		9401.0517	2703.0630	58

Total Cases = 1445

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			59424.6818	26773.6894	1782
CLASS	5		13465.4370	10612.0581	119
CLASS	6		22137.8108	15704.3565	37
CLASS	7		22107.6000	5713.9333	10
CLASS	8		26819.5462	18063.5134	119
CLASS	9		65799.9061	21373.5223	1182
CLASS	10		74860.0714	26869.1714	28
CLASS	11		70778.2048	20522.7298	249
CLASS	12		66478.0500	22635.2269	20
CLASS	13		68655.0000	24189.6859	18

Total Cases = 1782

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			7241.1667	3091.9217	1782
CLASS	5		4207.8403	1369.6693	119
CLASS	6		5997.4054	4535.2705	37
CLASS	7		4222.8000	890.0733	10
CLASS	8		5147.1681	2793.8729	119
CLASS	9		7813.4619	1997.6788	1182
CLASS	10		7193.2500	1896.0358	28
CLASS	11		7451.1687	5663.8515	249
CLASS	12		6375.6000	1291.1435	20
CLASS	13		5922.5000	2758.1983	18

Total Cases = 1782

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			43599.6106	19665.8690	1243
CLASS	5		9779.4783	3718.7209	69
CLASS	6		11500.5000	8736.8613	24
CLASS	7		23694.0000	7207.1275	6
CLASS	8		19580.0000	12522.5718	69
CLASS	9		48973.4739	17399.8957	806
CLASS	10		50215.5789	18765.9002	19
CLASS	11		44706.2111	13361.6603	199
CLASS	12		50223.5556	11602.4558	27
CLASS	13		44627.0000	16699.2722	24

Total Cases = 1243

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5695.6460	1373.8662	1243
CLASS	5		3856.6957	809.5573	69
CLASS	6		3652.0000	1767.8261	24
CLASS	7		5764.0000	2423.4376	6
CLASS	8		4949.0435	3406.3420	69
CLASS	9		5983.2357	954.8344	806
CLASS	10		6315.1579	811.6338	19
CLASS	11		5468.3819	866.3285	199
CLASS	12		6052.4444	681.6815	27
CLASS	13		6490.0000	1105.5339	24

Total Cases = 1243

8 WEST

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			66050.4090	33214.6440	1736
CLASS	5		22812.5089	29933.5639	112
CLASS	6		32666.9434	42478.9028	53
CLASS	7		32161.6667	31344.9881	27
CLASS	8		54496.7930	45315.9449	256
CLASS	9		72805.5980	20080.7720	918
CLASS	10		86290.4483	46594.8960	58
CLASS	11		76729.8904	27649.3099	219
CLASS	12		77956.2000	25627.8811	30
CLASS	13		72614.2857	31401.4283	63

Total Cases = 1736

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			8988.8427	10206.1203	1736
CLASS	5		7566.5893	13415.0998	112
CLASS	6		11174.0943	21107.6177	53
CLASS	7		5198.0000	5409.2859	27
CLASS	8		13276.8594	19326.1033	256
CLASS	9		8140.4216	3617.4423	918
CLASS	10		9614.7931	10796.5771	58
CLASS	11		8894.3836	8227.8576	219
CLASS	12		7196.7000	2343.6300	30
CLASS	13		6847.4286	4705.2659	63

Total Cases = 1736

9 EAST

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			51397.4259	21194.5871	2003
CLASS	5		10919.7876	4467.6494	113
CLASS	6		13495.0588	8922.1564	17
CLASS	7		20005.3333	6603.3358	9
CLASS	8		17273.9032	10136.5879	124
CLASS	9		57484.5730	16777.7784	1480
CLASS	10		46552.0000	20612.5090	9
CLASS	11		54596.8282	13016.1979	227
CLASS	12		52292.8421	11959.6875	19
CLASS	13		56100.0000	21845.7009	5

Total Cases = 2003

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5957.9910	1282.1105	2003
CLASS	5		4088.4956	794.4438	113
CLASS	6		4309.4118	1860.8847	17
CLASS	7		4429.3333	1354.3855	9
CLASS	8		4386.8710	2390.0355	124
CLASS	9		6301.8405	944.1476	1480
CLASS	10		5720.0000	643.2884	9
CLASS	11		5726.0088	813.7698	227
CLASS	12		5620.4211	952.1866	19
CLASS	13		5992.8000	650.6944	5

Total Cases = 2003

9 WEST

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			57448.8777	22517.9815	2061
CLASS	5		13190.3115	12751.2106	122
CLASS	6		13356.9474	7174.7952	19
CLASS	7		20320.5000	4423.0561	6
CLASS	8		22116.6563	14633.0523	96
CLASS	9		62587.4474	17098.0916	1567
CLASS	10		70587.0000	22311.2330	7
CLASS	11		63603.8791	17060.6338	215
CLASS	12		63453.4615	16538.7928	26
CLASS	13		133584.000	15690.1813	3

Total Cases = 2061

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			6789.1179	1870.4246	2061
CLASS	5		4233.3197	1343.9140	122
CLASS	6		4118.2105	1805.7641	19
CLASS	7		4209.0000	950.0977	6
CLASS	8		4806.2813	2617.1948	96
CLASS	9		7123.2042	1073.8406	1567
CLASS	10		7747.7143	1668.2759	7
CLASS	11		7006.2279	3674.2108	215
CLASS	12		6456.8077	840.3674	26
CLASS	13		6831.0000	746.3491	3

Total Cases = 2061

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			53934.9307	27460.8911	996
CLASS	5		20723.0000	21091.7666	63
CLASS	6		27809.6538	35547.5301	52
CLASS	7		44567.1000	36366.6069	10
CLASS	8		43053.6742	26729.5450	178
CLASS	9		62273.6265	20150.5852	490
CLASS	10		65768.0400	35329.4750	25
CLASS	11		56946.2804	27308.4755	107
CLASS	12		66530.9189	24435.4252	37
CLASS	13		63092.3824	22483.9795	34

Total Cases = 996

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			7561.0472	7444.5723	996
CLASS	5		10175.8571	18053.5074	63
CLASS	6		7973.4808	14647.9258	52
CLASS	7		6789.6000	4622.2790	10
CLASS	8		8350.5787	9376.8794	178
CLASS	9		7210.7816	1474.3170	490
CLASS	10		6185.1600	3124.1003	25
CLASS	11		7308.8411	7223.6778	107
CLASS	12		6758.2703	2702.1303	37
CLASS	13		5905.5882	3303.4562	34

Total Cases = 996

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			52353.4029	23313.5274	1534
CLASS	5		12265.7476	5877.6323	103
CLASS	6		11662.2000	7948.4649	20
CLASS	7		24525.6000	8350.2216	10
CLASS	8		23413.3659	12874.7281	123
CLASS	9		59629.8108	18429.1020	888
CLASS	10		61888.0000	25028.5178	66
CLASS	11		56945.4104	18335.5612	173
CLASS	12		61286.5846	14063.3193	65
CLASS	13		56015.5814	16372.8950	86

Total Cases = 1534

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			6623.1473	1619.9004	1534
CLASS	5		4440.5825	1348.0248	103
CLASS	6		4309.8000	1905.7893	20
CLASS	7		5689.2000	2627.0985	10
CLASS	8		5178.0488	2179.1514	123
CLASS	9		7060.5135	1236.1095	888
CLASS	10		7326.0000	1235.5065	66
CLASS	11		6299.3757	1252.5322	173
CLASS	12		6859.9385	1557.1261	65
CLASS	13		7367.4419	1148.8795	86

Total Cases = 1534

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			51798.5373	24384.2765	2239
CLASS	5		12246.9851	7101.9341	201
CLASS	6		31453.6500	34003.5891	20
CLASS	7		23391.0000	15320.5640	13
CLASS	8		24000.0785	17129.0360	191
CLASS	9		59171.6044	19230.9606	1471
CLASS	10		53437.8462	18937.9257	13
CLASS	11		60975.0346	17225.9622	260
CLASS	12		61078.1429	14157.8976	63
CLASS	13		80079.4286	39009.0074	7

Total Cases = 2239

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			6478.2032	1745.8931	2239
CLASS	5		4154.4179	960.6032	201
CLASS	6		7369.2000	6323.1461	20
CLASS	7		4840.6154	3668.5735	13
CLASS	8		4794.5969	2046.4405	191
CLASS	9		7061.0782	1233.0224	1471
CLASS	10		6257.7692	1828.4750	13
CLASS	11		6280.8577	1258.0497	260
CLASS	12		6269.1429	810.6477	63
CLASS	13		6771.8571	733.9436	7

Total Cases = 2239

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			51305.0348	24468.9129	1952
CLASS	5		13017.3429	8781.8587	105
CLASS	6		17778.3429	9517.8659	35
CLASS	7		15170.1429	4331.7180	7
CLASS	8		30412.0075	16009.8823	268
CLASS	9		59735.2173	20635.1682	1238
CLASS	10		66766.1250	25067.4818	24
CLASS	11		51199.8158	20335.7988	190
CLASS	12		52124.7414	22094.1515	58
CLASS	13		59110.0000	31928.7446	27

Total Cases = 1952

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			6373.0973	1962.1532	1952
CLASS	5		4510.6286	1835.7526	105
CLASS	6		4577.6571	2186.5196	35
CLASS	7		3075.4286	1232.9312	7
CLASS	8		5691.7276	2608.8791	268
CLASS	9		6782.1761	1329.4670	1238
CLASS	10		6227.2500	1699.2173	24
CLASS	11		6308.0526	2635.3410	190
CLASS	12		6052.9655	1843.0447	58
CLASS	13		6079.6667	4466.3571	27

Total Cases = 1952

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			45785.7836	21641.0904	1788
CLASS	5		20450.3455	17954.5489	165
CLASS	6		17209.6277	10038.6728	94
CLASS	7		20315.5714	9550.0302	7
CLASS	8		22347.3025	10051.3439	119
CLASS	9		52878.0166	17894.7726	1086
CLASS	10		56215.2857	22504.9616	14
CLASS	11		52946.6653	16335.2161	242
CLASS	12		48648.8333	14039.1058	54
CLASS	13		59823.0000	41758.7977	7

Total Cases = 1788

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5591.8943	1304.9696	1788
CLASS	5		4669.4182	1192.0545	165
CLASS	6		4765.4043	2191.3085	94
CLASS	7		4110.4286	1380.4928	7
CLASS	8		4547.0420	1242.8572	119
CLASS	9		5983.3674	1050.0057	1086
CLASS	10		5189.7857	1357.3030	14
CLASS	11		5416.2149	1217.5221	242
CLASS	12		5424.1667	862.7907	54
CLASS	13		5115.8571	1991.6308	7

Total Cases = 1788

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			36591.8692	24673.7578	1743
CLASS	5		11388.8824	6543.8469	204
CLASS	6		11880.8354	13034.4878	158
CLASS	7		13884.3158	8774.1489	38
CLASS	8		25719.0577	15912.7935	208
CLASS	9		48712.3408	22127.8894	669
CLASS	10		44464.8387	22907.4259	124
CLASS	11		41075.0769	21508.9518	143
CLASS	12		58578.0000	18405.8412	66
CLASS	13		44059.2180	23378.4833	133

Total Cases = 1743

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5378.5267	2780.3046	1743
CLASS	5		4108.1765	1313.2833	204
CLASS	6		3858.0759	5351.2138	158
CLASS	7		3550.1053	1987.9017	38
CLASS	8		5323.1538	3890.6482	208
CLASS	9		6211.8924	1696.2291	669
CLASS	10		5475.8710	1869.5284	124
CLASS	11		5485.8462	2034.8068	143
CLASS	12		6044.0000	2005.6938	66
CLASS	13		5014.0150	2465.7486	133

Total Cases = 1743

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			42501.6154	22833.8687	2228
CLASS	5		12783.7286	6517.8819	280
CLASS	6		18497.3077	10115.4464	39
CLASS	7		18423.0000	3397.7559	8
CLASS	8		26273.3182	13485.8640	198
CLASS	9		50666.9105	20240.8136	1442
CLASS	10		47982.6000	24173.1335	5
CLASS	11		44314.3674	18842.7798	215
CLASS	12		51973.3421	13412.0581	38
CLASS	13		79695.0000	39006.7320	3

Total Cases = 2228

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5902.9376	1311.0363	2228
CLASS	5		4426.8429	1301.3197	280
CLASS	6		5535.9231	2657.1466	39
CLASS	7		3803.6250	552.5388	8
CLASS	8		4872.8636	1526.6409	198
CLASS	9		6368.7670	917.4027	1442
CLASS	10		6251.4000	766.1797	5
CLASS	11		5731.4930	974.2225	215
CLASS	12		6199.1053	780.4029	38
CLASS	13		6072.0000	726.9601	3

Total Cases = 2228

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			53091.7962	28509.6998	1865
CLASS	5		14576.7068	9720.0460	249
CLASS	6		21807.4074	11222.0225	27
CLASS	7		17120.0000	4553.0942	10
CLASS	8		27627.2727	11008.4511	176
CLASS	9		63917.6983	23349.4926	1147
CLASS	10		62266.6667	14769.5633	9
CLASS	11		63740.0000	24604.9363	210
CLASS	12		65509.6774	20758.6665	31
CLASS	13		79000.0000	45388.8092	6

Total Cases = 1865

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			7103.2708	1835.7545	1865
CLASS	5		4928.5141	1599.5558	249
CLASS	6		6503.7037	2296.7337	27
CLASS	7		4220.0000	720.8020	10
CLASS	8		5681.8182	1526.4933	176
CLASS	9		7835.7454	1423.9336	1147
CLASS	10		10688.8889	4208.4571	9
CLASS	11		6955.2381	1066.0916	210
CLASS	12		6858.0645	839.3546	31
CLASS	13		7600.0000	1296.1481	6

Total Cases = 1865

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			40911.8850	22266.7411	2749
CLASS	5		11344.0381	5626.2643	315
CLASS	6		13752.0000	7750.6451	44
CLASS	7		23856.0000	9318.8804	11
CLASS	8		19468.2697	11504.3754	267
CLASS	9		49095.0361	18438.3826	1826
CLASS	10		36336.0000	17223.8110	22
CLASS	11		44934.5769	18705.1160	208
CLASS	12		51067.5000	17051.0650	40
CLASS	13		61990.5000	46387.7092	16

Total Cases = 2749

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5523.4965	1294.0968	2749
CLASS	5		4144.8000	1073.2937	315
CLASS	6		4566.0000	1928.9608	44
CLASS	7		5232.0000	1765.3220	11
CLASS	8		4116.7191	1418.9772	267
CLASS	9		6004.1928	957.0279	1826
CLASS	10		5796.0000	770.6650	22
CLASS	11		5312.3654	918.7697	208
CLASS	12		5695.8000	967.9462	40
CLASS	13		6055.5000	868.7633	16

Total Cases = 2749

30 NORTH

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			34578.5765	23986.7631	281
CLASS	5		13103.4286	8312.2920	63
CLASS	6		19857.2143	12561.8250	14
CLASS	7		26703.0000	1035.0000	3
CLASS	8		25514.2286	12978.0662	35
CLASS	9		47425.6134	22625.5475	119
CLASS	10		55978.7143	27815.0949	7
CLASS	11		36901.2000	20532.9359	30
CLASS	12		79902.0000	.0000	1
CLASS	13		46391.0000	35873.3814	9

Total Cases = 281

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5994.1601	2191.0833	281
CLASS	5		4333.8571	1575.5323	63
CLASS	6		6239.5714	4095.8625	14
CLASS	7		6210.0000	1996.2357	3
CLASS	8		5346.5143	2034.6827	35
CLASS	9		6904.0588	1315.9853	119
CLASS	10		7511.1429	4338.3076	7
CLASS	11		6203.1000	1612.1303	30
CLASS	12		6831.0000	.0000	1
CLASS	13		5681.0000	3937.2346	9

Total Cases = 281

30 SOUTH

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			53175.4397	35747.7779	307
CLASS	5		13852.6333	7615.9808	60
CLASS	6		13148.7500	10878.5631	16
CLASS	7		19311.0000	11545.6395	2
CLASS	8		19082.6364	8965.7000	44
CLASS	9		80491.4211	19668.0327	114
CLASS	10		56031.5556	29389.2557	9
CLASS	11		71441.0385	28924.1038	26
CLASS	12		90319.8571	11710.8791	7
CLASS	13		77070.7586	25367.1923	29

Total Cases = 307

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			6646.1629	2681.2871	307
CLASS	5		4539.9167	1571.9391	60
CLASS	6		5151.5625	4006.5132	16
CLASS	7		4003.5000	777.1104	2
CLASS	8		4417.4091	1575.3184	44
CLASS	9		8279.6842	1875.1861	114
CLASS	10		8303.5556	2163.3045	9
CLASS	11		7028.7692	1920.9552	26
CLASS	12		9621.8571	2154.0383	7
CLASS	13		7395.2414	2710.6770	29

Total Cases = 307

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			48977.7055	41637.0720	275
CLASS	5		18152.3077	21558.4017	52
CLASS	6		57028.5000	43995.8847	16
CLASS	7		21735.0000	.0000	1
CLASS	8		51185.7581	48533.7508	62
CLASS	9		57078.5250	37231.7273	120
CLASS	10		39123.0000	16100.8214	2
CLASS	11		68832.9474	50252.0595	19
CLASS	12		60582.0000	15276.4504	3

Total Cases = 275

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			7476.8400	9957.2175	275
CLASS	5		5023.7308	6253.8315	52
CLASS	6		7646.0625	11844.4208	16
CLASS	7		4347.0000	.0000	1
CLASS	8		9668.9032	14963.9897	62
CLASS	9		7748.7000	8537.5592	120
CLASS	10		5899.5000	731.8555	2
CLASS	11		5665.2632	1318.6233	19
CLASS	12		6486.0000	978.2438	3

Total Cases = 275

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			57083.3536	23910.4519	1434
CLASS	5		11303.7722	5376.0171	79
CLASS	6		15352.5000	8971.1629	18
CLASS	7		25005.6000	10524.8865	5
CLASS	8		19355.9577	11135.4717	71
CLASS	9		62810.6641	19117.8204	1152
CLASS	10		59771.2500	25410.0405	8
CLASS	11		61823.1039	15656.4734	77
CLASS	12		62089.6500	16472.8135	20
CLASS	13		87664.5000	59431.3547	4

Total Cases = 1434

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			6721.8703	1516.3039	1434
CLASS	5		4129.5190	1067.8630	79
CLASS	6		5117.5000	3910.0577	18
CLASS	7		4926.6000	1165.4670	5
CLASS	8		4358.6620	1526.3104	71
CLASS	9		7105.3828	1128.8321	1152
CLASS	10		6442.8750	895.0549	8
CLASS	11		6414.3117	999.2433	77
CLASS	12		6758.5500	1122.3403	20
CLASS	13		5175.0000	3079.5961	4

Total Cases = 1434

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			59490.2089	24579.0630	1235
CLASS	5		16671.6000	18007.8011	60
CLASS	6		22287.6923	20506.8451	13
CLASS	7		23793.0000	4965.2299	4
CLASS	8		20702.3607	11825.8834	61
CLASS	9		64102.1511	18402.5602	993
CLASS	10		76868.0000	26904.2640	6
CLASS	11		55682.0000	22087.9531	66
CLASS	12		68970.0000	15484.9767	20
CLASS	13		137775.000	34273.2663	12

Total Cases = 1235

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			6924.9231	1893.5087	1235
CLASS	5		4259.2000	1228.1800	60
CLASS	6		6772.6154	6168.4135	13
CLASS	7		4818.0000	1769.3253	4
CLASS	8		4304.0656	1408.1950	61
CLASS	9		7309.9819	1583.2659	993
CLASS	10		6776.0000	1596.4180	6
CLASS	11		6194.0000	1538.9029	66
CLASS	12		6468.0000	1149.9521	20
CLASS	13		7436.0000	1298.6270	12

Total Cases = 1235

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			49044.5964	28944.8826	503
CLASS	5		11085.7500	5561.1168	92
CLASS	6		22173.3529	10400.5611	17
CLASS	7		14904.0000	.0000	1
CLASS	8		21773.1316	9895.1051	38
CLASS	9		65624.0642	20413.4288	327
CLASS	10		30429.0000	.0000	1
CLASS	11		34845.0000	15963.0732	27

Total Cases = 503

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			6100.9443	1599.4546	503
CLASS	5		4277.2500	1309.6422	92
CLASS	6		5455.0588	1252.6091	17
CLASS	7		3312.0000	.0000	1
CLASS	8		4722.8684	1021.8874	38
CLASS	9		6872.1468	1156.2891	327
CLASS	10		5796.0000	.0000	1
CLASS	11		5435.6667	1056.4219	27

Total Cases = 503

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			34963.7538	18516.3017	520
CLASS	5		13604.7033	8495.4373	91
CLASS	6		21309.7500	13703.0978	16
CLASS	8		30159.8710	13164.2178	31
CLASS	9		40257.3448	15817.6242	348
CLASS	10		57332.0000	43165.6819	3
CLASS	11		47873.5714	19778.5442	28
CLASS	12		45408.0000	.0000	1
CLASS	13		49896.0000	25201.2857	2

Total Cases = 520

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			6121.5000	1553.3731	520
CLASS	5		4614.1978	1864.1582	91
CLASS	6		5131.5000	2195.0003	16
CLASS	8		5096.9032	1465.4091	31
CLASS	9		6698.2414	1078.7745	348
CLASS	10		6336.0000	924.0000	3
CLASS	11		5520.4286	682.6418	28
CLASS	12		7788.0000	.0000	1
CLASS	13		5412.0000	.0000	2

Total Cases = 520

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			43936.2130	23671.5445	507
CLASS	5		10549.8462	8035.0191	65
CLASS	6		17386.2857	7557.7577	14
CLASS	7		14388.0000	.0000	1
CLASS	8		20526.0000	11244.6647	56
CLASS	9		55607.6053	16931.0566	304
CLASS	10		49676.0000	31902.0634	3
CLASS	11		48251.5932	20742.5222	59
CLASS	12		56416.8000	12085.2470	5

Total Cases = 507

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			6007.4320	1664.7120	507
CLASS	5		3970.1538	974.0054	65
CLASS	6		6204.0000	2233.5231	14
CLASS	7		3564.0000	.0000	1
CLASS	8		4744.9286	2223.9936	56
CLASS	9		6714.1974	1208.3130	304
CLASS	10		7304.0000	1075.0777	3
CLASS	11		5722.9831	713.6941	59
CLASS	12		6177.6000	872.5989	5

Total Cases = 507

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			42374.2912	26462.9058	491
CLASS	5		10660.5000	6029.0755	60
CLASS	6		14478.5000	9022.7734	18
CLASS	7		7866.0000	.0000	1
CLASS	8		19306.2000	12990.0200	60
CLASS	9		54049.8309	23020.8193	272
CLASS	10		49845.6000	18174.4350	5
CLASS	11		48947.2857	18440.5415	63
CLASS	12		47876.1429	17648.3795	7
CLASS	13		73940.4000	47481.4414	5

Total Cases = 491

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5883.2688	2420.2319	491
CLASS	5		3926.1000	1294.6607	60
CLASS	6		3864.0000	2505.2182	18
CLASS	7		1449.0000	.0000	1
CLASS	8		4847.2500	3109.6258	60
CLASS	9		6611.0625	1431.9279	272
CLASS	10		6541.2000	2866.7819	5
CLASS	11		5743.4286	1565.4528	63
CLASS	12		5411.5714	1436.2706	7
CLASS	13		12130.2000	12346.9904	5

Total Cases = 491

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			46099.1160	27474.6667	543
CLASS	5		13504.7647	8804.0881	68
CLASS	6		23892.0000	14245.7602	9
CLASS	7		37884.0000	.0000	1
CLASS	8		18100.9231	9961.8152	78
CLASS	9		55279.4595	22271.7200	296
CLASS	10		73480.0000	26674.8889	3
CLASS	11		66665.0769	22965.9057	78
CLASS	12		73505.1429	18335.4016	7
CLASS	13		50380.0000	21232.0403	3

Total Cases = 543

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5930.2762	1637.4002	543
CLASS	5		4612.2353	1176.6464	68
CLASS	6		5206.6667	1864.5568	9
CLASS	7		10956.0000	.0000	1
CLASS	8		4105.5385	1193.7176	78
CLASS	9		6736.4595	1363.0517	296
CLASS	10		5632.0000	2071.7413	3
CLASS	11		5804.6154	833.2064	78
CLASS	12		6128.5714	548.8044	7
CLASS	13		7304.0000	1282.0546	3

Total Cases = 543

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			31987.0475	21388.6752	653
CLASS	5		11481.4110	12985.4848	73
CLASS	6		18306.5625	20625.0061	32
CLASS	7		18245.5714	8303.6234	7
CLASS	8		23213.8378	17548.9980	111
CLASS	9		41004.6968	19080.2185	310
CLASS	10		26141.1429	15238.4032	7
CLASS	11		35006.9684	21030.0196	95
CLASS	12		26392.5000	8799.5698	6
CLASS	13		31722.7500	29783.5688	12

Total Cases = 653

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5131.5712	2622.9583	653
CLASS	5		4423.5616	5033.3959	73
CLASS	6		3079.1250	2129.0865	32
CLASS	7		4258.2857	1433.4265	7
CLASS	8		5158.2162	3791.7164	111
CLASS	9		5759.9419	1050.7959	310
CLASS	10		3489.4286	1541.7844	7
CLASS	11		4784.9684	1007.2616	95
CLASS	12		4692.0000	1909.1940	6
CLASS	13		2863.5000	2445.8087	12

Total Cases = 653

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			56492.4717	23933.5705	636
CLASS	5		11376.0000	5854.0786	33
CLASS	6		19875.4286	19393.4996	7
CLASS	7		37092.0000	.0000	1
CLASS	8		20346.0000	14684.0755	44
CLASS	9		63725.0442	18361.1493	452
CLASS	10		44051.3333	16356.5873	18
CLASS	11		57931.5000	19141.0898	40
CLASS	12		69750.3529	13388.1662	17
CLASS	13		57612.5000	24144.4713	24

Total Cases = 636

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			6605.8113	1966.7192	636
CLASS	5		3944.0000	1210.5908	33
CLASS	6		8221.7143	7594.9586	7
CLASS	7		17424.0000	.0000	1
CLASS	8		4707.0000	3250.0692	44
CLASS	9		6979.0619	1340.7139	452
CLASS	10		6299.3333	1734.0066	18
CLASS	11		5900.4000	1189.7662	40
CLASS	12		6794.1176	1156.5242	17
CLASS	13		7067.5000	1511.0493	24

Total Cases = 636

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			56584.9104	25608.2141	815
CLASS	5		16167.5625	12606.0978	48
CLASS	6		22578.9231	12562.2061	13
CLASS	7		21010.5000	11214.3575	4
CLASS	8		34082.8989	15004.8101	89
CLASS	9		64344.2602	19631.4655	588
CLASS	10		47357.0000	25472.7310	9
CLASS	11		43405.9286	20861.1602	42
CLASS	12		50922.0000	19365.6059	8
CLASS	13		102760.714	52054.8072	14

Total Cases = 815

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			7112.1644	2492.6669	815
CLASS	5		5459.6250	6401.6556	48
CLASS	6		5987.0769	3902.4318	13
CLASS	7		4036.5000	2114.3744	4
CLASS	8		6328.6180	2949.6076	89
CLASS	9		7434.7500	1485.1215	588
CLASS	10		5612.0000	1650.9611	9
CLASS	11		6505.7143	2114.5274	42
CLASS	12		6417.0000	885.1692	8
CLASS	13		9315.0000	4435.9418	14

Total Cases = 815

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			50299.8886	26251.6847	745
CLASS	5		12156.0750	8359.5341	80
CLASS	6		15257.1176	9703.0256	17
CLASS	7		19561.5000	7260.6138	8
CLASS	8		32412.1935	18427.5329	93
CLASS	9		60330.6896	19919.2445	422
CLASS	10		53264.3684	24114.1972	19
CLASS	11		61626.4091	24413.9539	66
CLASS	12		68857.9412	14700.4510	17
CLASS	13		59184.0000	30916.9157	23

Total Cases = 745

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			6338.3678	2238.5778	745
CLASS	5		4274.5500	1394.6783	80
CLASS	6		4127.8235	2653.3882	17
CLASS	7		3596.6250	1066.6743	8
CLASS	8		6065.3226	2852.7732	93
CLASS	9		6943.8199	1540.6343	422
CLASS	10		6493.2632	3291.9657	19
CLASS	11		6282.1364	2327.9604	66
CLASS	12		7744.2353	3444.4349	17
CLASS	13		5094.0000	3394.3290	23

Total Cases = 745

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			46357.6931	23119.0244	971
CLASS	5		10906.3059	5210.6761	85
CLASS	6		12197.6250	9540.7647	32
CLASS	7		15351.6000	9294.5353	10
CLASS	8		21173.2632	15676.9473	57
CLASS	9		56662.6042	17122.8651	576
CLASS	10		50108.4878	18671.9092	41
CLASS	11		43063.4286	19294.1828	84
CLASS	12		54567.8571	18895.3350	28
CLASS	13		43072.9655	19028.6894	58

Total Cases = 971

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5659.4150	1527.5324	971
CLASS	5		3977.0824	1062.4210	85
CLASS	6		3741.3750	1353.0584	32
CLASS	7		4540.8000	2499.2620	10
CLASS	8		4717.2632	3289.3782	57
CLASS	9		6084.3750	921.6347	576
CLASS	10		6242.6341	1108.4243	41
CLASS	11		5443.4286	1706.8148	84
CLASS	12		5859.8571	917.5797	28
CLASS	13		5885.3793	1325.7848	58

Total Cases = 971

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			31166.9270	27123.0928	370
CLASS	5		9928.5540	4884.5752	139
CLASS	6		32391.6667	13792.1866	27
CLASS	7		19665.0000	.0000	1
CLASS	8		17771.8125	10264.2009	48
CLASS	9		54822.4714	24568.2002	140
CLASS	10		66136.5000	44935.9288	2
CLASS	11		33389.1000	15774.3266	10
CLASS	12		51439.5000	17710.9035	2
CLASS	13		160218.000	.0000	1

Total Cases = 370

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5618.0919	2464.8693	370
CLASS	5		4002.9928	1231.5949	139
CLASS	6		9874.6667	4470.6599	27
CLASS	7		3519.0000	.0000	1
CLASS	8		4450.5000	1711.7658	48
CLASS	9		6794.0357	1256.3789	140
CLASS	10		8073.0000	2049.1955	2
CLASS	11		5278.5000	1493.4954	10
CLASS	12		6003.0000	1463.7110	2
CLASS	13		6417.0000	.0000	1

Total Cases = 370

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			28450.3279	23455.7592	366
CLASS	5		10617.1546	5826.3120	97
CLASS	6		14085.6774	7274.4810	31
CLASS	7		25443.0000	8383.3857	4
CLASS	8		14489.8286	8662.2397	70
CLASS	9		48631.8462	22778.4439	130
CLASS	10		39677.6471	16695.7211	17
CLASS	11		47014.0000	25416.6905	6
CLASS	12		58564.0000	10701.2306	3
CLASS	13		46975.5000	17641.1381	8

Total Cases = 366

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5153.4098	2129.6960	366
CLASS	5		4038.9278	1234.2559	97
CLASS	6		4794.5806	1909.9407	31
CLASS	7		7029.0000	2675.7825	4
CLASS	8		3888.3429	1896.3797	70
CLASS	9		6118.7077	1019.5389	130
CLASS	10		8479.0588	4360.1304	17
CLASS	11		5192.0000	1618.0996	6
CLASS	12		8492.0000	6135.2790	3
CLASS	13		6154.5000	581.5602	8

Total Cases = 366

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			26313.6429	25494.6394	168
CLASS	5		14342.8000	14776.4064	45
CLASS	6		14716.7143	13968.2681	21
CLASS	8		20401.5349	24220.1922	43
CLASS	9		52422.7500	20976.2709	32
CLASS	10		38502.0000	44204.0733	2
CLASS	11		36690.7500	24215.8835	12
CLASS	12		93253.5000	46106.8977	2
CLASS	13		18874.6364	15743.9302	11

Total Cases = 168

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5448.5357	6136.3205	168
CLASS	5		5556.8000	6879.2940	45
CLASS	6		6653.5714	10599.5897	21
CLASS	8		5083.5349	6271.6791	43
CLASS	9		6319.9688	1477.7935	32
CLASS	10		3933.0000	3220.1643	2
CLASS	11		4795.5000	1487.0333	12
CLASS	12		6417.0000	2049.1955	2
CLASS	13		2408.7273	1614.7930	11

Total Cases = 168

26 SOUTH

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			29345.0000	23130.9949	132
CLASS	5		9534.6977	3613.9172	43
CLASS	6		19140.0000	20467.6631	3
CLASS	7		24288.0000	9333.8095	2
CLASS	8		18282.0000	11533.8492	18
CLASS	9		46950.4444	21090.7284	54
CLASS	10		32604.0000	5967.8016	3
CLASS	11		45177.0000	25274.7379	8
CLASS	12		33924.0000	.0000	1

Total Cases = 132

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5142.0000	1773.8073	132
CLASS	5		4036.7442	1055.6985	43
CLASS	6		6644.0000	5681.1140	3
CLASS	7		5082.0000	2146.7762	2
CLASS	8		4216.6667	1336.5686	18
CLASS	9		6157.5556	1535.3419	54
CLASS	10		6116.0000	726.9993	3
CLASS	11		5428.5000	915.7128	8
CLASS	12		4884.0000	.0000	1

Total Cases = 132

27 NORTH

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			62898.8419	49698.5586	930
CLASS	5		43663.0307	41767.7665	163
CLASS	6		54363.6168	50325.4609	107
CLASS	7		53992.5000	54938.7814	18
CLASS	8		77973.5844	61332.1305	231
CLASS	9		63002.2863	36182.6511	248
CLASS	10		76577.0625	51546.6006	16
CLASS	11		63563.3465	47174.9072	101
CLASS	12		103722.923	60685.4585	13
CLASS	13		59396.4545	39493.6912	33

Total Cases = 930

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			11884.7258	17751.3812	930
CLASS	5		19639.6933	25913.2982	163
CLASS	6		13141.0000	20454.1824	107
CLASS	7		7682.0000	10587.8471	18
CLASS	8		14581.7446	20528.0752	231
CLASS	9		6935.3347	3522.2274	248
CLASS	10		5187.9375	2622.1475	16
CLASS	11		8591.5248	12159.1886	101
CLASS	12		6496.6154	7123.4965	13
CLASS	13		5563.9091	4559.8057	33

Total Cases = 930

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			50554.2589	34535.9926	1213
CLASS	5		18054.7869	11279.7129	122
CLASS	6		11338.9091	9513.5653	121
CLASS	7		12217.9200	5966.8380	25
CLASS	8		24923.4857	16950.7721	140
CLASS	9		68310.7066	29374.4582	467
CLASS	10		50811.2000	32936.8364	45
CLASS	11		70463.8000	33344.1563	120
CLASS	12		75375.3000	24276.2151	40
CLASS	13		62365.5338	26367.0722	133

Total Cases = 1213

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			7185.5664	3535.6598	1213
CLASS	5		6057.9344	3695.7198	122
CLASS	6		4243.6364	2063.0789	121
CLASS	7		4092.0000	949.5746	25
CLASS	8		5838.1714	3506.6961	140
CLASS	9		8736.8737	3446.0766	467
CLASS	10		7488.8000	3910.9361	45
CLASS	11		7029.0000	2680.7415	120
CLASS	12		7939.8000	2887.2672	40
CLASS	13		7260.9925	2778.7773	133

Total Cases = 1213

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			58234.8059	38130.8333	809
CLASS	5		27267.7105	35661.6386	114
CLASS	6		43517.3143	49403.8180	35
CLASS	7		48392.0000	42971.9209	9
CLASS	8		59590.3540	55418.7526	113
CLASS	9		65744.1628	28345.9475	387
CLASS	10		91098.8182	41155.6872	11
CLASS	11		63349.0169	27114.1290	118
CLASS	12		61272.0000	14736.3066	8
CLASS	13		64332.6429	38597.7771	14

Total Cases = 809

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			9798.4574	12479.1279	809
CLASS	5		11834.1930	20989.6017	114
CLASS	6		8457.4286	12100.9519	35
CLASS	7		8832.0000	10764.0000	9
CLASS	8		15636.8761	22677.6064	113
CLASS	9		8374.1395	3448.0325	387
CLASS	10		8487.0000	6593.5268	11
CLASS	11		7894.0678	3095.0073	118
CLASS	12		7891.8750	1538.8867	8
CLASS	13		7614.6429	7104.2739	14

Total Cases = 809

28 SOUTH

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			91643.2560	61267.8925	1258
CLASS	5		53739.4567	28654.2679	427
CLASS	6		78974.7619	37245.4477	252
CLASS	7		86749.3846	50979.8289	26
CLASS	8		93837.7554	39401.8256	278
CLASS	9		108000.750	46020.3428	32
CLASS	10		152239.102	55708.0166	49
CLASS	11		124857.184	44546.2732	98
CLASS	12		148610.880	44330.8245	25
CLASS	13		242668.056	77294.8942	71

Total Cases = 1258

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			25441.8983	20037.5524	1258
CLASS	5		27629.7330	20135.4465	427
CLASS	6		26398.4286	20211.7123	252
CLASS	7		16434.0000	18078.0928	26
CLASS	8		24359.6978	19991.9657	278
CLASS	9		19804.1250	20453.4603	32
CLASS	10		19228.8980	19126.5751	49
CLASS	11		25249.7143	19503.1194	98
CLASS	12		18707.0400	19266.4811	25

Total Cases = 1258

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			40262.7145	26598.6780	767
CLASS	5		11307.7025	6669.6384	158
CLASS	6		22676.3571	11355.0997	42
CLASS	7		29394.0000	13873.6336	3
CLASS	8		27775.1038	13802.6158	106
CLASS	9		55690.0769	23449.6339	351
CLASS	10		68310.0000	28981.4785	7
CLASS	11		51959.3258	20710.0534	89
CLASS	12		48189.6000	26417.2067	5
CLASS	13		36570.0000	38171.7579	6

Total Cases = 767

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5844.5789	1983.3003	767
CLASS	5		4128.2089	1575.2949	158
CLASS	6		6919.7143	3064.9038	42
CLASS	7		4761.0000	1242.0000	3
CLASS	8		5331.2264	1661.8574	106
CLASS	9		6671.1795	1510.4625	351
CLASS	10		7777.2857	3311.6919	7
CLASS	11		5826.2360	1288.7726	89
CLASS	12		5920.2000	2740.6988	5
CLASS	13		2725.5000	2639.2838	6

Total Cases = 767

29 SOUTH

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			42792.7500	25252.7348	896
CLASS	5		10548.2466	5291.3653	146
CLASS	6		28267.4118	16049.6851	68
CLASS	7		25850.0000	9830.8518	12
CLASS	8		19629.7391	12347.8865	69
CLASS	9		55121.3484	19142.1119	442
CLASS	10		41066.6667	13726.0079	9
CLASS	11		57670.6789	21671.6709	109
CLASS	12		57450.4615	16962.9976	13
CLASS	13		51758.1429	25624.6606	28

Total Cases = 896

Summaries of FRNTAXL
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			5833.1920	2061.8793	896
CLASS	5		3970.8493	1056.0577	146
CLASS	6		7407.5294	3744.6194	68
CLASS	7		7183.0000	5104.4181	12
CLASS	8		4273.7391	1756.7441	69
CLASS	9		6354.8145	1410.1033	442
CLASS	10		6424.0000	1074.4022	9
CLASS	11		5804.3670	1046.4015	109
CLASS	12		6346.1538	1455.4574	13
CLASS	13		6435.0000	2552.1580	28

Total Cases = 896

APPENDIX F
Statistical Analysis Tables

Summaries of GROSS
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			52629.0442	32541.7158	54813
CLASS	5		19672.3278	23060.6713	5893
CLASS	6		34205.9404	37966.3588	2079
CLASS	7		38757.8384	40896.2133	464
CLASS	8		43343.9743	43394.3005	6737
CLASS	9		59262.8950	22268.1645	30795
CLASS	10		70087.7175	49813.1917	1055
CLASS	11		60689.8982	32348.6569	5689
CLASS	12		68680.1964	38683.6016	1069
CLASS	13		67919.8421	50998.7378	1032

Total Cases = 54813

Summaries of ST_AXLE
By levels of CLASS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			7710.9068	8395.0717	54813
CLASS	5		8035.3214	12917.7699	5893
CLASS	6		10171.9062	15069.1214	2079
CLASS	7		8230.1013	11986.9905	464
CLASS	8		10009.7475	14701.8980	6737
CLASS	9		6968.0271	2730.7629	30795
CLASS	10		9149.0995	11036.4216	1055
CLASS	11		7447.9093	7605.4953	5689
CLASS	12		7608.0935	7394.0663	1069
CLASS	13		7913.8130	8326.0178	1032

Total Cases = 54813

Summaries of GROSS
By levels of ROUTE

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			52629.0442	32541.7158	54813
ROUTE	1.00	I 8	46830.1908	26143.0537	3633
ROUTE	2.00	I 10	48373.9648	25274.1285	19981
ROUTE	3.00	I 17	63402.6241	49736.5856	6066
ROUTE	4.00	I 19	41887.1789	25203.9283	1023
ROUTE	5.00	I 40	57627.3841	32976.6302	20022
ROUTE	6.00	US 60	29587.3074	24966.7352	732
ROUTE	7.00	SR 85	47763.3496	24552.2296	1639
ROUTE	8.00	SR 87	27695.3131	24583.9441	297
ROUTE	9.00	US 89	43660.2998	31819.8736	577
ROUTE	10.00	US 93	39662.6335	25850.8259	843

Total Cases = 54813

Summaries of ST_AXLE
By levels of ROUTE

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			7710.9068	8395.0717	54813
ROUTE	1.00	I 8	6173.8794	2300.7955	3633
ROUTE	2.00	I 10	6280.9109	2715.7804	19981
ROUTE	3.00	I 17	13339.6233	17285.0079	6066
ROUTE	4.00	I 19	6111.3930	1575.4608	1023
ROUTE	5.00	I 40	8182.0559	8925.3830	20022
ROUTE	6.00	US 60	5381.5369	2319.4632	732
ROUTE	7.00	SR 85	5936.6980	1915.1750	1639
ROUTE	8.00	SR 87	5333.8788	4751.1794	297
ROUTE	9.00	US 89	6344.6776	2464.7745	577
ROUTE	10.00	US 93	5721.8790	1845.9562	843

Total Cases = 54813

MANOVA BY SITE

54813 cases accepted.
0 cases rejected because of out-of-range factor values.
0 cases rejected because of missing data.
24 non-empty cells.

1 design will be processed.

- - - - - - - - - -

Cell Means and Standard Deviations
Variable .. GROSS

FACTOR	CODE	Mean	Std. Dev.	N
SITE	1	39662.633	25850.826	843
SITE	2	59299.628	46362.379	2484
SITE	3	49348.138	25352.139	4017
SITE	25	29587.307	24966.735	732
SITE	5	66543.251	42293.773	3289
SITE	6	62605.370	28743.411	3216
SITE	26	27695.313	24583.944	297
SITE	8	56559.623	30150.524	2955
SITE	9	54407.887	21981.718	4061
SITE	10	52914.555	25083.258	2510
SITE	11	51539.235	24403.582	4178
SITE	12	41236.101	23591.163	3505
SITE	13	47273.824	26046.935	4111
SITE	27	55905.485	42592.954	2071
SITE	15	41562.572	24388.202	3016
SITE	28	75147.924	47941.836	2009
SITE	29	59339.314	55915.924	1986
SITE	18	57942.803	23779.869	2661
SITE	19	41887.179	25203.928	1023
SITE	20	43075.304	24919.727	996
SITE	30	43660.300	31819.874	577
SITE	22	38339.051	25289.482	1192
SITE	23	56422.790	24542.510	1445
SITE	24	47763.350	24552.230	1639
For entire sample		52629.044	32541.716	54813

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Variable .. ST_AXLE

FACTOR	CODE	Mean	Std. Dev.	N
SITE	1	5721.879	1845.956	843
SITE	2	9374.560	13718.381	2484
SITE	3	6264.844	2272.969	4017
SITE	25	5381.537	2319.463	732
SITE	5	12973.405	15296.898	3289
SITE	6	7529.494	2876.555	3216
SITE	26	5333.879	4751.179	297
SITE	8	7640.853	8029.935	2955
SITE	9	6379.152	1660.742	4061
SITE	10	6996.286	4873.266	2510
SITE	11	6428.494	1824.583	4178
SITE	12	5492.304	2163.358	3505
SITE	13	6446.938	1684.024	4111
SITE	27	9325.331	12396.180	2071
SITE	15	5702.725	3291.433	3016
SITE	28	19357.539	18992.966	2009
SITE	17	11438.116	18183.227	1986
SITE	18	6811.966	1704.187	2661
SITE	19	6111.393	1575.461	1023
SITE	20	5943.322	2071.924	996
SITE	30	6344.678	2464.774	577
SITE	22	5500.301	2260.120	1192
SITE	23	6888.440	2285.052	1445
SITE	24	5936.698	1915.175	1639
For entire sample		7710.907	8395.072	54813

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* * ANALYSIS OF VARIANCE -- DESIGN 1 * *

EFFECT .. SITE
Multivariate Tests of Significance (S = 2, M = 10 , N = 27393)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.16917	220.11627	46.00	109578.00	.000
Hotellings	.19030	226.64780	46.00	109574.00	.000
Wilks	.83588	223.38004	46.00	109576.00	.000
Roys	.13042				

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Univariate F-tests with (23,54789) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. o
GROSS	4.5954E+12	5.3448E+13	1.9980E+11	975532761	204.81251	.00
ST_AXLE	4.9322E+11	3.3698E+12	2.1444E+10	61504668.6	348.66109	.00

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MANOVA ON ROUTE TYPE

54813 cases accepted.
0 cases rejected because of out-of-range factor values.
0 cases rejected because of missing data.
2 non-empty cells.

1 design will be processed.

- - - - - - - - - - -
Cell Means and Standard Deviations
Variable .. GROSS

FACTOR	CODE	Mean	Std. Dev.	N
RTTYPE	INTERSTA	53582.270	32757.547	50725
RTTYPE	NON-INTE	40801.159	27075.729	4088
For entire sample		52629.044	32541.716	54813

- - - - - - - - - - -
Variable .. ST_AXLE

FACTOR	CODE	Mean	Std. Dev.	N
RTTYPE	INTERSTA	7864.363	8682.184	50725
RTTYPE	NON-INTE	5806.780	2392.307	4088
For entire sample		7710.907	8395.072	54813

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* * ANALYSIS OF VARIANCE -- DESIGN 1 * *

EFFECT .. RTTYPE
Multivariate Tests of Significance (S = 1, M = 0, N = 27404)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.01079	298.98351	2.00	54810.00	.000
Hotellings	.01091	298.98351	2.00	54810.00	.000
Wilks	.98921	298.98351	2.00	54810.00	.000
Roys	.01079				

- - - - - - - - - - -
Univariate F-tests with (1,54811) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
GROSS	6.1800E+11	5.7426E+13	6.1800E+11	1047707528	589.85669	.000
ST_AXLE	1.6016E+10	3.8470E+12	1.6016E+10	70186303.3	228.19789	.000

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MANOVA BY ROUTE (INTERSTATE ONLY)

50725 cases accepted.
0 cases rejected because of out-of-range factor values.
0 cases rejected because of missing data.
5 non-empty cells.

1 design will be processed.

- - - - - - - - - - -

Cell Means and Standard Deviations
Variable .. GROSS

FACTOR	CODE	Mean	Std. Dev.	N
ROUTE	I 8	46830.191	26143.054	3633
ROUTE	I 10	48373.965	25274.129	19981
ROUTE	I 17	63402.624	49736.586	6066
ROUTE	I 19	41887.179	25203.928	1023
ROUTE	I 40	57627.384	32976.630	20022
For entire sample		53582.270	32757.547	50725

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Variable .. ST_AXLE

FACTOR	CODE	Mean	Std. Dev.	N
ROUTE	I 8	6173.879	2300.796	3633
ROUTE	I 10	6280.911	2715.780	19981
ROUTE	I 17	13339.623	17285.008	6066
ROUTE	I 19	6111.393	1575.461	1023
ROUTE	I 40	8182.056	8925.383	20022
For entire sample		7864.363	8682.184	50725

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* * ANALYSIS OF VARIANCE -- DESIGN 1 * *

EFFECT .. ROUTE
Multivariate Tests of Significance (S = 2, M = 1/2, N = 25358 1/2)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.07581	499.57738	8.00	101440.00	.000
Hotellings	.08053	510.53107	8.00	101436.00	.000
Wilks	.92486	505.05320	8.00	101438.00	.000
Roys	.06566				

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Univariate F-tests with (4,50720) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
GROSS	1.7602E+12	5.2670E+13	4.4005E+11	1038437549	423.75805	.000
ST_AXLE	2.4749E+11	3.5761E+12	6.1874E+10	70506630.3	877.55837	.000

MANOVA BY MACHINE

47140 cases accepted.
7673 cases rejected because of out-of-range factor values.
0 cases rejected because of missing data.
6 non-empty cells.

1 design will be processed.

- - - - - - - - - - -

Cell Means and Standard Deviations
Variable .. GROSS

FACTOR	CODE	Mean	Std. Dev.	N
MACHINE	1	43734.442	26251.437	3056
MACHINE	2	66217.058	31800.716	3153
MACHINE	3	58863.293	34550.464	7888
MACHINE	4	46476.658	23827.613	7747
MACHINE	5	50966.202	29937.978	15575
MACHINE	6	49835.116	24619.856	9721
For entire sample		51867.818	29301.112	47140

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Variable .. ST_AXLE

FACTOR	CODE	Mean	Std. Dev.	N
MACHINE	1	5854.908	2575.509	3056
MACHINE	2	8515.405	7773.729	3153
MACHINE	3	9232.250	10544.102	7888
MACHINE	4	6069.982	1571.762	7747
MACHINE	5	6837.625	6300.125	15575
MACHINE	6	6322.856	1777.997	9721
For entire sample		7054.525	6209.544	47140

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* * ANALYSIS OF VARIANCE -- DESIGN 1 * *

EFFECT .. MACHINE
Multivariate Tests of Significance (S = 2, M = 1 , N = 23565 1/2)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.05253	254.29326	10.00	94268.00	.000
Hotellings	.05471	257.86267	10.00	94264.00	.000
Wilks	.94781	256.07784	10.00	94266.00	.000
Roys	.04499				

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Univariate F-tests with (5,47134) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
GROSS	1.5154E+12	3.8956E+13	3.0307E+11	826496008	366.69694	.000
ST_AXLE	6.1982E+10	1.7556E+12	1.2396E+10	37247512.2	332.81005	.000

MANOVA BY MACHINE (OLD VS. NEW)

47140 cases accepted.
7673 cases rejected because of out-of-range factor values.
0 cases rejected because of missing data.
2 non-empty cells.

1 design will be processed.

- - - - - - - - - - -

Cell Means and Standard Deviations
Variable .. GROSS

FACTOR	CODE	Mean	Std. Dev.	N
MACHINE	OLD	57228.381	33203.193	14097
MACHINE	NEW	49580.862	27148.528	33043
For entire sample		51867.818	29301.112	47140

- - - - - - - - - - -

Variable .. ST_AXLE

FACTOR	CODE	Mean	Std. Dev.	N
MACHINE	OLD	8339.765	8885.280	14097
MACHINE	NEW	6506.208	4508.168	33043
For entire sample		7054.525	6209.544	47140

- - - - - - - - - - -

* * ANALYSIS OF VARIANCE -- DESIGN 1 * *

EFFECT .. MACHINE
Multivariate Tests of Significance (S = 1, M = 0, N = 23567 1/2)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.02172	523.38268	2.00	47137.00	.000
Hotellings	.02221	523.38268	2.00	47137.00	.000
Wilks	.97828	523.38268	2.00	47137.00	.000
Roys	.02172				

- - - - - - - - - - -

Univariate F-tests with (1,47138) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
GROSS	5.7791E+11	3.9894E+13	5.7791E+11	846313461	682.85184	.000
ST_AXLE	3.3220E+10	1.7844E+12	3.3220E+10	37854503.0	877.58151	.000

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MANOVA BY MACHINE WITH ROUTE AS COVARIATE

47140 cases accepted.
7673 cases rejected because of out-of-range factor values.
0 cases rejected because of missing data.
6 non-empty cells.

1 design will be processed.

- - - - - - - - - -

CELL NUMBER

Variable MACHINE	1	2	3	4	5	6

Cell Means and Standard Deviations
Variable .. GROSS

FACTOR	CODE	Mean	Std. Dev.	N
MACHINE	1	43734.442	26251.437	3056
MACHINE	2	66217.058	31800.716	3153
MACHINE	3	58863.293	34550.464	7888
MACHINE	4	46476.658	23827.613	7747
MACHINE	5	50966.202	29937.978	15575
MACHINE	6	49835.116	24619.856	9721
For entire sample		51867.818	29301.112	47140

- - - - - - - - - - -

Variable .. ST_AXLE

FACTOR	CODE	Mean	Std. Dev.	N
MACHINE	1	5854.908	2575.509	3056
MACHINE	2	8515.405	7773.729	3153
MACHINE	3	9232.250	10544.102	7888
MACHINE	4	6069.982	1571.762	7747
MACHINE	5	6837.625	6300.125	15575
MACHINE	6	6322.856	1777.997	9721
For entire sample		7054.525	6209.544	47140

- - - - - - - - - - -

Variable .. ROUTE

FACTOR	CODE	Mean	Std. Dev.	N
MACHINE	1	2.942	2.252	3056
MACHINE	2	5.000	.000	3153
MACHINE	3	4.080	2.018	7888
MACHINE	4	2.000	.000	7747
MACHINE	5	4.058	2.005	15575
MACHINE	6	3.297	1.606	9721
For entire sample		3.557	1.891	47140

```
* * ANALYSIS  OF  VARIANCE -- DESIGN   1 * *

 EFFECT .. WITHIN CELLS Regression
 Multivariate Tests of Significance (S = 1, M = 0, N = 23565 )

 Test Name          Value  Approx. F Hypoth. DF   Error DF  Sig. of F

 Pillais          .00186   43.80448       2.00   47132.00       .000
 Hotellings       .00186   43.80448       2.00   47132.00       .000
 Wilks            .99814   43.80448       2.00   47132.00       .000
 Roys             .00186

 - - - - - - - - - - -
 Univariate F-tests with (1,47133) D. F.

 Variable    Sq. Mul. R      Mul. R  Adj. R-sq.  Hypoth. MS    Error MS

 GROSS           .00058      .02412      .00056 22672231249 826032516.7
 ST_AXLE         .00184      .04295      .00182  3238856747 37179585.08

 Variable             F   Sig. of F

 GROSS         27.44714        .000
 ST_AXLE       87.11385        .000

 - - - - - - - - - - -
 Regression analysis for WITHIN CELLS error term
 Dependent variable .. GROSS

 COVARIATE            B        Beta   Std. Err.     t-Value   Sig. of t

 ROUTE        409.39553      .02412      78.144       5.239        .000

 COVARIATE   Lower -95%  CL- Upper

 ROUTE          256.233     562.559
 Dependent variable .. ST_AXLE

 COVARIATE            B        Beta   Std. Err.     t-Value   Sig. of t

 ROUTE        154.73617      .04295      16.579       9.333        .000

 COVARIATE   Lower -95%  CL- Upper

 ROUTE          122.242     187.230

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* * ANALYSIS  OF  VARIANCE -- DESIGN    1 * *

 EFFECT .. MACHINE
 Multivariate Tests of Significance (S = 2, M = 1 , N = 23565 )

 Test Name          Value  Approx. F Hypoth. DF   Error DF  Sig. of F

 Pillais           .04405  212.31980       10.00   94266.00        .000
 Hotellings        .04548  214.33079       10.00   94262.00        .000
 Wilks             .95623  213.32526       10.00   94264.00        .000
 Roys              .03618

 - - - - - - - - - -
 Univariate F-tests with (5,47133) D. F.

 Variable   Hypoth. SS   Error SS Hypoth. MS   Error MS            F  Sig.

 GROSS      1.2297E+12 3.8933E+13 2.4594E+11  826032517   297.73073
 ST_AXLE    4.9873E+10 1.7524E+12 9974660627 37179585.1   268.28327

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* * ANALYSIS  OF  VARIANCE -- DESIGN    1 * *

 EFFECT .. CONSTANT
 Multivariate Tests of Significance (S = 1, M = 0, N = 23565 )

 Test Name          Value  Approx. F Hypoth. DF   Error DF  Sig. of F

 Pillais           .35672 13068.2954        2.00   47132.00        .000
 Hotellings        .55454 13068.2954        2.00   47132.00        .000
 Wilks             .64328 13068.2954        2.00   47132.00        .000
 Roys              .35672

 - - - - - - - - - -
 Univariate F-tests with (1,47133) D. F.

 Variable   Hypoth. SS   Error SS Hypoth. MS   Error MS            F  Sig.

 GROSS      2.1246E+13 3.8933E+13 2.1246E+13  826032517 25721.0668
 ST_AXLE    3.5139E+11 1.7524E+12 3.5139E+11 37179585.1 9451.19624

 - - - - - - - - - -
 Adjusted and Estimated Means
 Variable .. GROSS
  CELL        Obs. Mean   Adj. Mean   Est. Mean  Raw Resid. Std. Resid.

     1       43734.442   43988.511   43734.442        .000        .000
     2       66217.058   65628.758   66217.058        .000        .000
     3       58863.293   58651.484   58863.293        .000        .000
     4       46476.658   47116.545   46476.658        .000        .000
     5       50966.202   50763.405   50966.202        .000        .000
     6       49835.116   49944.063   49835.116        .000        .000

 - - - - - - - - - -
```

Adjusted and Estimated Means (CONT.)
Variable .. ST_AXLE

CELL	Obs. Mean	Adj. Mean	Est. Mean	Raw Resid.	Std. Resid.
1	5854.908	5950.937	5854.908	.000	.000
2	8515.405	8293.050	8515.405	.000	.000
3	9232.250	9152.194	9232.250	.000	.000
4	6069.982	6311.835	6069.982	.000	.000
5	6837.625	6760.975	6837.625	.000	.000
6	6322.856	6364.035	6322.856	.000	.000

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MANOVA BY MACHINE (OLD VS. NEW) WITH ROUTE AS COVARIATE
(INTERSTATES ONLY)

47140 cases accepted.
7673 cases rejected because of out-of-range factor values.
0 cases rejected because of missing data.
2 non-empty cells.

1 design will be processed.

- - - - - - - - - - -

	CELL NUMBER	
Variable		
MACHINE	1	2

Cell Means and Standard Deviations
Variable .. GROSS

FACTOR	CODE	Mean	Std. Dev.	N
MACHINE	OLD	57228.381	33203.193	14097
MACHINE	NEW	49580.862	27148.528	33043
For entire sample		51867.818	29301.112	47140

- - - - - - - - - - -

Variable .. ST_AXLE

FACTOR	CODE	Mean	Std. Dev.	N
MACHINE	OLD	8339.765	8885.280	14097
MACHINE	NEW	6506.208	4508.168	33043
For entire sample		7054.525	6209.544	47140

- - - - - - - - - - -

Variable .. ROUTE

FACTOR	CODE	Mean	Std. Dev.	N
MACHINE	OLD	4.039	1.961	14097
MACHINE	NEW	3.352	1.821	33043
For entire sample		3.557	1.891	47140

- - - - - - - - - - -

* * ANALYSIS OF VARIANCE -- DESIGN 1 * *

EFFECT .. WITHIN CELLS Regression
Multivariate Tests of Significance (S = 1, M = 0, N = 23567)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.00651	154.51684	2.00	47136.00	.000
Hotellings	.00656	154.51684	2.00	47136.00	.000
Wilks	.99349	154.51684	2.00	47136.00	.000
Roys	.00651				

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Univariate F-tests with (1,47137) D. F.

Variable	Sq. Mul. R	Mul. R	Adj. R-sq.	Hypoth. MS	Error MS
GROSS	.00474	.06884	.00472	1.89044E+11	842320893.4
ST_AXLE	.00504	.07101	.00502	8998248153	37664410.38

Variable	F	Sig. of F
GROSS	224.43227	.000
ST_AXLE	238.90585	.000

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Regression analysis for WITHIN CELLS error term
Dependent variable .. GROSS

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t
ROUTE	1074.18677	.06884	71.703	14.981	.000

COVARIATE	Lower -95% CL-	Upper
ROUTE	933.648	1214.726

Dependent variable .. ST_AXLE

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t
ROUTE	234.35668	.07101	15.162	15.457	.000

COVARIATE	Lower -95% CL-	Upper
ROUTE	204.638	264.075

- - - - - - - - - - -

* * ANALYSIS OF VARIANCE -- DESIGN 1 * *

EFFECT .. MACHINE
Multivariate Tests of Significance (S = 1, M = 0, N = 23567)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.01763	423.08117	2.00	47136.00	.000
Hotellings	.01795	423.08117	2.00	47136.00	.000
Wilks	.98237	423.08117	2.00	47136.00	.000
Roys	.01763				

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Univariate F-tests with (1,47137) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig.
GROSS	4.5859E+11	3.9704E+13	4.5859E+11	842320893	544.43263	
ST_AXLE	2.6871E+10	1.7754E+12	2.6871E+10	37664410.4	713.44206	

- - - - - - - - - - -

```
* * ANALYSIS  OF  VARIANCE -- DESIGN   1 * *

 EFFECT .. CONSTANT
 Multivariate Tests of Significance (S = 1, M = 0, N = 23567 )

 Test Name          Value  Approx. F Hypoth. DF   Error DF  Sig. of F

 Pillais          .36656 13638.1263       2.00   47136.00       .000
 Hotellings       .57867 13638.1263       2.00   47136.00       .000
 Wilks            .63344 13638.1263       2.00   47136.00       .000
 Roys             .36656

 - - - - - - - - - - -
 Univariate F-tests with (1,47137) D. F.

 Variable   Hypoth. SS   Error SS Hypoth. MS   Error MS          F  Sig.

 GROSS      2.2490E+13 3.9704E+13 2.2490E+13  842320893 26700.4973
 ST_AXLE    3.9567E+11 1.7754E+12 3.9567E+11 37664410.4 10505.0106

 - - - - - - - - - - -
 Adjusted and Estimated Means
 Variable .. GROSS
  CELL        Obs. Mean   Adj. Mean   Est. Mean  Raw Resid. Std. Resid.

     1       57228.381   56859.067   57228.381        .000        .000
     2       49580.862   49950.176   49580.862        .000        .000

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 Adjusted and Estimated Means (CONT.)
 Variable .. ST_AXLE
  CELL        Obs. Mean   Adj. Mean   Est. Mean  Raw Resid. Std. Resid.

     1        8339.765    8259.191    8339.765        .000        .000
     2        6506.208    6586.782    6506.208        .000        .000

 - - - - - - - - - - -

      4928 BYTES OF WORKSPACE NEEDED FOR MANOVA EXECUTION.
```

APPENDIX G
Site Notes

FORENSIC.01 88/10/06 07:00:00
FORENSIC WIM SITE 1 ON US-93 AT MP 035.2 SB & 047.5 NB

88/10/04

15:00

SET SB AT MP 035.2 ON DIVIDED HIGHWAY TWO LANES EACH WAY IN SLOW LANE. MACHINE 0349-0003 WITH MAT 207 AND TWO TEMPORARY LOOPS 6'x 6', 16' LEADING EDGE TO LEADING EDGE. LOOPS HAVE 4 TURNS EACH & NO NAILS LEFT AT CORNERS. BLACK PUTTY USED AT CORNERS OF LOOPS AND IN CENTER OF EACH SIDE. DUCT TAPE USED OVER P46 PRIMER. P46 TAKES TOO LONG TO GET TACKY, STAYS SLIMY. SITE NUMBER 00030001.

15:30

SET NB AT MP 047.5 ON SPEED LOOPS. MAT RPM06 WITH CORRECTION FACTOR 132. ROAD IS 2 LANES, 1 NB & 1 SB. MACHINE 0381-0074 WITH LOOPS 18'. SITE NUMBER 00740001.

88-10-05

08:00

NORTHBOUND MACHINE LOOKS OK AND STILL WORKING BUT ONLY 300 SOME RECORDINGS, SO NO RETRIEVE DONE.

08:45

SOUTHBOUND STATION IS LIKEWISE-OK AND NO RETRIEVE.

15:00
PICKED UP BOTH STATIONS. RETRIEVED BOTH.... SB MACHINE TOOK A HIKE CAUSE THERE IS NO CONFIG 47 DATA IN THE MACHINE. NB OK. RETRIEVED NB INTO FILE FORENSIC.01N

88/10/06

07:00

RESET SB WITH 0381-0014. SITE NUMBER 00140001, MAT RPM06 WITH CORRECTION FACTOR 132. ALL ELSE IS THE SAME AS ORIGINAL SET.

88/10/07

07:00

PICKED UP SB & RETRIEVED OK INTO FILE FORENSIC.01S. END SITE.

FORENSIC.02 88/11/03 09:20
FORENSIC WIM SITE 02 ON I-40 AT MP 9 E & W BOUND

88/11/02

08:20

SET WB ON MACHINE 381-0074 WITH MAT 033/207 ON THREE TURN 6' x 6' LOOPS 18' LEADING EDGE TO LEADING EDGE TEMPS.

09:15

SET EB ON MACHINE 381-0014 WITH MAT RPM6/132 ON THREE TURN 6' X 6' LOOPS 18' LEADING EDGE TO LEADING EDGE TEMPS.

15:40

RETRIEVED WB FILE TO FORENSIC.02A
RETRIEVED EB FILE TO FORENSIC.02B

88/11/03

09:05

RETRIEVED WB TO FORENSIC.02C
RETRIEVED EB TO FORENSIC.02D. EB LOOP A NOT OPERATING, END SITE

FORENSIC.03 88/11/01 15:00:00
FORENSIC WIM SITE NUMBER 03 AT MP56 EAST AND WEST BOUND

88/10/31

14:00

SET WB ON MAT 033/207 MACHINE 381-0014 ON 4 TURN LOOPS 6' x 6' 18' LEADING EDGE TO LEADING EDGE. SITE NUMBER 00140003

14:35

SET EB ON MAT RPM6/132 MACHINE 381-0074 ON 3 TURN LOOPS 6' x 6' 18' LEADING EDGE TO LEADING EDGE. SITE NUMBER 00740003
RESET TO CONFIG 44, ALL PARAMETERS MESSED UP

88/11/01

07:15

RETREIVE EB TO FILE FORENSIC.03A
RETREIVE WB TO FORENSIC.03B

15:00

RETRIEVED EB TO FILE FORENSIC.03C END SITE
RETRIEVED WB TO FILE FORENSIC.03D END SITE

89/05/31

08:30

FORENSIC STATION 3. EB SET WITH MACHINE #80 AND MAT RPM6 WITH A C.F. OF 132. SITE # 00800303. 18 FOOT LOOPS 6X6. WEATHER IS WINDY AND COOL. I-40 M.P. 56.0. RUNNING AT 09:00.

09:15

WB SET WITH MACHINE #74 AND MAT 207. 18 FOOT LOOPS 6X6. SITE # 00740307. RUNNING AT 10:35.

89/06/01

09:30

EB PICKED UP AT THIS TIME. NO ERRORS, NO PROBLEMS. 2300+ RECORDINGS WHICH CORRESPONDS TO MANUAL CLASSIFICATION OF APPROXIMA 100 TRUCKS PER HOUR.

10:45

WB PICKED UP AT THIS TIME. STATUS MODE 1 SHOWED 9 ERRORS AND MODE 2 SHOWED NOISE ON THE MAT (2'S). LOOKS LIKE WE'RE DUE FOR A NEW OSCILLATOR AND/OR MAT. ONLY ABOUT 1800 RECORDINGS.

FORENSIC.04 88/10/27 08:00:00
FORENSIC WIM SITE 04 AT MP 135 ON I-40 EB & WB

88/10/26

14:35

SET UP WB ON MACHINE 0381-0014 MAT 033/207 TWO 6' x 6' x 4 TURN TEMP LOOPS 18' LEADING EDGE TO LEADING EDGE. FLAT AFTER LONG UPHILL.

15:05

SETUP EB ON MACHINE 0381-0074 MAT RPM6/132 TWO 6' x 6' x 4 TURN TEMP LOOPS 18' LEADING EDGE TO LEADING EDGE. FLAT AFTER LONG DOWNHILL.

88/10/27

07:30

REPLACED WB MAT 033/207 WITH RPM9/127 BECAUSE MAT WAS IGNORING TRAFFIC AND SHOWING "L" FOR TEMPERATURE. RETRIEVED INTO FILE FORENSIC.04A

07:50

RETRIEVED EB INTO FILE FORENSIC.04B

15:00

WB CF WAS NOT CHANGED AT 7:30. RETRIEVED INTO FILE FORENSIC.04C
RESET CF FROM 207 TO 132.

15:20

RETRIEVED EB INTO FORENSIC.04D

08:00

RETRIEVED WB INTO FORENSIC.04E END SITE
RETRIEVED EB INTO FORENSIC.04F END SITE

FORENSIC.05 88/10/26 09:15:00
FORENSIC WIM SITE 05 AT MP 179.7 EB & WB ON I-40

88/10/25

12:55

SET WB ON MACHINE 0381-0074 WITH MAT RPM6/132 SITE 00740099. LEFT DOWN TRAFFIC SIDE OF MAT FREE OF NAILS. P46 PRIMER USED ON ONE TEMP LOOP 18' LEADING EDGE TO LEADING EDGE & ON PERIMETER OF MAT FOR TAPE ADHESION. 6' x 6' LOOPS 3 TURNS ON PERM LOOP AND 4 TURNS ON TEMP.

13:30

SET EB ON MACHINE 0381-0014 WITH MAT RPM9/132 SITE 00140099. LEFT DOWN TRAFFIC SIDE OF MAT FREE OF NAILS. P46 PRIMER USED ON ONE TEMP LOOP 18' LEADING EDGE TO LEADING EDGE & ON PERIMETER OF MAT FOR TAPE ADHESION. 6' x 6' LOOPS 3 TURNS ON PERM LOOP AND 4 TURNS ON TEMP.

88/10/26

07:45

RETRIEVED WB INTO FORENSIC.05A

07:55

RETRIEVED EB INTO FORENSIC.05B SCAN OF DATA SHOWS HEAVY TRUCKS, TOO HEAVY.

13:30

RETRIEVED WB INTO FORENSIC.05C END SITE
RETRIEVED EB INTO FORENSIC.06D END SITE

FORENSIC.06 88/09/13 14:00:00
FORENSIC WIM SITE #06 I-40 EAST OF WINONA INTERCHANGE

88/09/12

11:45
WB SETUP. OSC 2,3 FAILED WITH MAT 207 ON TESTER. OSC 1 MAT 207 MACHINE 0381-0014. STATUS MODE 2 SHOWED "0" ON TEMP BUT IT WORKS. LOOPS ARE SPEED SITE 18'. NO PRIMER USED ON MAT. MP 212 SITE #03496002.

12:15
START WB

12:20
EB SETUP. OSC 2,3 FAILED WITH MAT 157 ON TESTER. OSC 4 MAT 157 MACHINE 0349-003. TEMPORARY LOOPS 18' X 6' WITH PRIMER & BLACK SCOTCH RUBBER TAPE WITH SCOTCH FOAM, 4516(1/16") & 4508(1/8") UNDER LOOP AT LEADING EDGE. MP 211.9 SITE # 00036001. BATTERY DOWN TO 5.5V. MACHINE 0349-005 IS JUNK. IT DOES NOT KNOW THAT IT HAS LOOPS & MAT ATTACHED.

13:45
START EB

16:45
BATTERY OUT ON EB. REPLACED WITH JUNK MACHINE. 30 MINUTES SLOW. ALL DATA RETRIEVED TO FORENSIC.06A

17:00
WB RETRIEVED TO FORENSIC.06B

88/09/13

07:15
RETRIEVED EB TO FORENSIC.06C TEMPERATURE OVERNIGHT WAS BELOW 32'. LOOPS LOOK GOOD.

07:20
RETRIEVED WB TO FORENSIC.06D

10:00
EB & WB CHECKED. EB VOLTAGE UP TO 5.9V.

13:45
EB RETRIEVED TO FORENSIC.06E BATTERY VOLTAGE UP TO 6.0VOLTS. SOME WEAR ON RUBBER TAPE LOOP A AT CROSSOVER POINT WHERE LEAD-IN JOINS LOOP. STATUS MODE 1 HAD 1 ERROR SHOWING. END SITE.

14:00
WB RETRIEVED TO FORENSIC.06F END SITE.

FORENSIC.08 88/11/09 08:05:00
FORENSIC WIM SITE .08 EB AND WB AT MP 319.5

88/11/07

15:50:00

SET EB ON MACHINE 381-0074 ON MAT RPM6/132 ON 2 TEMPS 3 TURNS 18 FOOT LEADING EDGE TO LEADING EDGE

16:00:00

SET WB ON 381-0014 ON MAT 033/207 ON PERM LOOPS 18 FOOT LEADING EDGE TO LEADING EDGE STAT. MODE 2 DISPLAYED 010 FOR LOOPS AND MAT REPLACED WITH MACHINE 349-0003. STATUS MODE 2 DISPLAYED 101; REPLACED WITH MACHINE 349-0005. DISPLAYED ---.

07:50:00

RETRIEVED EB ON FORENSIC.08A. RETRIEVED WB ON FORENSIC.08B. STATUS MODE 2 DISPLAYED 000 -- MAT ACTUATING FIRST THEN LOOPS. RECORDINGS 1 ENTERED TO RESTART LOOP BOARD LOST COMMUNICATION. STATUS WENT TO 2 ERRORS AND IT STARTED WORKING.

11:15:00

RETRIEVED FORENSIC.08C. STATUS MODE 2 011 LOOP B AND MAT INOPERATIVE.

15:10:00

RETRIEVED EB INTO FORENSIC.08D, END EB. MCVED 381-0014 TO WB. RETRIEVED 381-0074 INTO FORENSIC.08E. TEST READING ON PRIMITIVE TRIQUARTER 67.6 ON LOOPS AND 102.6 ON MAT.

88/11/09

7:45:00

RETRIEVED WB FILE TO FORENSIC.08F. FOUND A TWISTED MASS OF METAL THAT USED TO BE A FLANGE FOR THE MAT.

16:17:11

RETRIEVED WB TO FORENSIC.08G. END WB END OF SITE.

89/05/10

08:30

STATION 09 ON I-40 AT M.P. 343.0. BOTH SIDES ON TEMPORARY LOOPS 16 FEET AND 6X6. PAVEMENT IS FAIR, WEATHER CLEAR.

EB SET WITH MACHINE #80 AND MAT #RPM6. SITE #00800901. UP AND RUNNING AT 08:45 WITH NO PROBLEMS. COULD NOT NAIL DOWN OSCILLATOR COVER BUT IT IS TAPED DOWN PRETTY WELL.

09:45

WB SET WITH MACHINE #74 AND MAT 207. WHEN COMMUNICATION WAS FIRST ESTABLISHED WE SAW THAT THE WEIGHMAN HAD RESET COMPLETELY.?? ALL NUMBERS PLUGGED INTO THE WEIGHMAN AND IT LOOKS OK. RUNNING AT 09:50.

89/05/11

08:45

RETRIEVED EB. STATUS MODE 1 SHOWED 1 ERROR BUT IT ALSO COLLECTED 2100+ RECORDINGS. FILE DUMPED TO FORENSIC.09E. OSCILLATOR COVER WAS STILL IN PLACE.

09:50

RETRIEVED WB INTO FORENSIC.09W. NO ERRORS AND 2100+ RECORDINGS.

FORENSIC.10 89/03/13 06:30:00
FORENSIC WIM STUDY STATION 10 AT MP 14.0 ON I-10

89/03/08

10:30

BOTH SIDES HAVE A NEW LOOP CUT INTO FRESH AC BASE. MILLING OF THE SLOW LANE PROMPTED THE REPLACEMENT OF LOOPS. SIGNING, BARRICADES, CONES ON EAST BOUND SLOW LANE START THE TAPER TO FAST LANE AT EAST BOUND SITE SO THAT ONLY 3/4 OF MAT IS EXPOSED TO TRAFFIC. 6' x 6' 16' SEPARATION SECOND LOOP TEMPORARY. BOTH MACHINES HAD RESET, SITE#, DATE, TIME, RECORDINGS, INTERVAL, START DATE, START TIME, CONFIG, THRESHOLDS PARAMETERS. #74 HAD RESET LAST 9 HOURS EARLIER AND #73 11 HOURS.

11:00

MILLING PROCEEDING EAST OF SITE, SIGNING WILL PREVENT COUNT UNTIL DAY'S WORK IS DONE. EB SET WITH MACHINE 381-0074 SITE 00740010 MAT RPM6 CF 132.

11:30

WB SET WITH MACHINE 381-0073 SITE 00730010 MAT 033 CF 207.

89/03/09

09:30

RETRIEVED OVER 1000 RECORDINGS IN WB TO FILE FORENSIC.10A IN LESS THAN 5 MINUTES. EB, WELL THAT A STORY ALL BY ITSELF. THE SIGNING WAS EXACTLY WHERE IT WAS YESTERDAY. IT MAY NOT HAVE MOVED AT ALL. HARDLY ANY TRAFFIC WAS CROSSING OVER THE MAT. THE MACHINE SHOWED 9 ERRORS AND 883 RECORDINGS(MAYBE YES/NO). STARTED RETRIEVING AT 9:50,IT SHOWED THAT IT WAS RETRIEVING TO FILE 2 (------2).....AT 10:15 I CANCELED THE RETRIEVE. 883 RECORDINGS SHOULD NOT TAKE 25 MINUTES TO RETRIEVE. WE HAVE EXPERIENCED THE SYMPTOM OF NON-STOP RETRIEVE IF THE LOOPS OR MAT WAS DISCONNECTED WHILE A RETRIEVE WAS IN PROGRESS. THIS WAS NOT THE CASE THIS TIME. I THEN DISCONNECTED THE MAT AND LOOPS JUST TO TRY AND GET SOMETHING TO WORK. NO LUCK. I WATCHED IT SHOW A RETRIEVE TO FILE 2 FOR ANOTHER 20 MINUTES AND THEN DID A RECORDING "0" TO THE WEIGHMAN. BY THE WAY, WE CANNOT DO A TOTAL RETRIEVE OF THE 381-0073,4 WEIGHMAN MACHINES. IT USES 107% OF THE RETRIEVER ELITE MEMORY. UNLIKE SOME PEOPLE, THE RETRIEVER IS SMART ENOUGH TO KNOW THAT 10 POUNDS WILL NOT FIT INTO A 5 POUND SACK.

89/03/10

09:00

CHECKED OUT LOANER MACHINE FROM GOLDEN RIVER 381-0014 FOR TOTAL RETRIEVE WITH MACHINE COLD STARTED (BATTERY REMOVED, POWER SUPPLY USED TO POWER UP) & RETRIEVER ELITE SHOWED 99% IN CONFIG 47 & ONLY TOOK 10:10 . WHY IS MACHINE #14 99% OF RETRIEVER MEMORY AND #73, #74 107%???

09:30

SITE PICKED UP. END SITE

14:00

IN SHOP; EB RETRIEVED TO FILE FORENSIC.10B. 9 ERRORS SHOWING IN STATUS MODE 1, DIRECTION DOES NOT HAVE 24 HOURS. WB RETRIEVED TO FORENSIC.10C. 9 ERRORS SHOWING IN STATUS MODE 1.

89/05/16

08:20

EB SET WITH MACHINE #74 AND MAT 207 AT M.P. 41.0 I-10. WEATHER COOL, LOOKS LIKE RAIN. TEMPORARY LOOPS 6X6 AND 16 FEET. NO PROBL SO FAR. UP AND RUNNING AT 08:30. SITE #00741101.

09:20

WB SET WITH MACHINE #80 AND MAT RPM6. MACHINE #80 HAD 1 ERROR SHOWING BEFORE IT WAS SET. A 3 CLEARED THE FAULT AND THE TIME WAS SPRINKLING NOW, HOPEFULLY WE GOT IT DOWN BEFORE THE PAVEMENT WAS WET. SITE #00801105. RUNNING AT 09:30.

89/05/17

08:45

EB PICKED UP AT THIS TIME WITH NO ERRORS AND 2200+ RECORDINGS. LOOKS OK.

09:30

WB WORKING BUT SOMETHING IS SCREWY. ONLY 700+ RECORDINGS RETRIEVED AND DUMPED TO DISK AND DISCOVERED THAT NO RECORDINGS HAD BEEN MADE BETWEEN 18:20 AND 09:00. HOOKED UP TEST BOX TO MAT OSCILLATOR AFTER SEEING 2'S ON STATUS MODE 2. TEST BOX SAYS SOMETHING IS WRONG. TIGHTENED OSCILLATOR AND RECHECKED - STILL NO GOOD. CHANGED MATS AND OSCILLATOR BUT STILL CAN'T GET A WORKING COMBINATION. PLACED MAT 207 ON THE GROUND AND TEST BOX AND WEIGHMAN SAY IT'S OK. RUNNING AT 10:35.

89/05/18

10:40

PICKED UP WB THIS TIME AND ALL LOOKS GOOD. NO ERRORS. 2000 SOME RECORDINGS.

EB DUMPED TO FILE CALLED FORENSIC.11A
WB DUMPED TO FILES CALLED FORENSIC.11B AND FORENSIC.11C
11B IS THE FIRST WB SET (THE PARTIAL) AND 11C IS THE LAST SET WITH MAT 207.

FORENSIC.012 88/07/15 12:30:00
I-10 WIM AT LITCHFIELD RD. FOR STATE WIDE PAVEMENT EVALUATION STUDY

88/07/12

9:00

MODEL 381-0014 IS SET AND RUNNING FINE AT EB MP. 129.2 ON SPEED LOOPS ON MAT 207 OSCILLATOR III CORRECTION FACTOR 207, SITE NUMBER 10129003. MODEL 349-0003 IS SET AND NOT RUNNING RIGHT AT WB MP. 129.2 ON TEMPORARY LOOPS ON MAT 157 OSCILLATOR I CORRECTION FACTOR 132.

11:30

RETRIEVED 381-0014 EB. 0349-0003 11:35A FUNCTIONS OK MISSING SOME VEHICLES.

11:40

3081-0074 FUNCTIONS OK MISSING SOME VEHICLES. 0349-0005 NO GO POWER DOWN RESTART -- DASHES IN STATUS MODE 2 (LOOP & MAT & TEMP) LOOPS & MAT CONNECTED, RECORDINGS RESET 3 & 1 BOTH SUCCESSFUL ON AGAIN OFF AGAIN COUNT/RECORDING MISSING LOTS OF STUFF.

11:54
RECONNECT OF 3081-0014 TO MAT 207 & OSCILLATOR III, MISSING SOME VEHICLES

12:01

3081-0074 ON MAT 157 WITH OSCILLATOR I IN TRAVEL LANE WITH TEMP LOOPS -- DASH IN STATUS MODE 2 FOR TEMP DISPLAY; OSCILLATOR II WITH TEST CAPACITOR AND TEMP LOOPS; DASH IN STATUS MODE 2 FOR MAT DISPLAY. 3049-0003 ON MAT 157 WITH OSCILLATOR I IN TRAVEL LANE WITH TEMP LOOPS; A IN TEMP DISPLAY CHANGE TO DASH; NO MAT DISPLAY; LOOPS QUESTIONABLE. OSCILLATOR II WITH TEST CAPACITOR AND TEMP LOOPS -- TEMP DISPLAY BUT NO MAT DISPLAY.

TWO OSCILLATORS (I, II) BROUGHT BACK TO SHOP FOR REPAIR. OSCILLATOR II FOUND TO HAVE AN OPEN INTERNAL CONNECTION & REPAIRED

15:00

RESET WB WITH MAT 157 AND OSC II WITH TEMPORARY LOOPS. 3081-0074 SITE NUMBER 00000000. WORKING OK. EB CHECKED AND FOUND TO BE MISSING SOME TRAFFIC, GETTING MOST.

88/07/13

8:30

OSCILLATOR I TESTED AND FOUND TO WORK, HOWEVER TEMP READOUT IS FLAKY. RETRIEVED WB AND EB. BOTH WORKING

9:30

RETRIEVED WB TO FORENSIC.12A

14:30

RETRIEVED WB AND EB. BOTH WORKING. EB MISSING RANDOMLY. MACHINE DOES NOT LIKE LOOPS, THEN OTHER TIMES IT'S THE MAT. RESET EB MAT AT 10A -- LONG NAILS CAME OUT IN HEAT. MISSING SPORADICALLY. RETREIVED BOTH SIDES.

15:10

RETRIEVED WB TO FORENSIC.12B
RETRIEVED EB TO FORENSIC.12C

88/07/14

15:00

RETRIEVED EB TO FORENSIC.12D

15:15

RETRIEVED WB TO FORENSIC.12E

88/07/14

11:20

RETRIEVED EB TO FORENSIC.12G

12:25

RETRIEVED WB TO FORENSIC.12F

88/07/15

10:30 A

RETRIEVED AND PICK UP BOTH SIDES. END STUDY AT LOCATION 12

ONE TEMP LOOP 18' FROM ONE PERM LOOP SITENUMBER 00000000 = WEST BOUND.

ONE TEMP LOOP 18' FROM ONE PERM LOOP SITENUMBER 10129003 = EAST BOUND

forensic.13 89/04/14 15:00
forensic wim site 13

89/04/13

11:00

16 FOOT LOOPS 6X6. SET TEMPORARY LOOPS AT M.P. 180.0 EB WITH MAT 207 AND MACHINE #74. RETRIEVER SHOWED 00- ON STATUS MODE 2 AND 9 ERRORS WITHIN 5 MINUTES. DISCOVERED WITH LEE'S COMPUTER THAT THERE WERE 27 ERRORS. WE THEN DISCOVERED WITH THE TEST BOX THAT WE HAD A BAD OSCILLATOR CORD AND CHANGED OSCILLATORS WITH ANOTHER MAT (132-RPM9). THEN STATUS MODE 2 SHOWED PROPER WORKING, BUT IT WOULD NOT RECORD TRAFFIC. WE SWITCHED MACHINES AND NOW #73 IS HOOKED UP AND GIVES SAME READINGS. WE THEN SWITCHED LOOPS A TO B AND IT TOOK OFF WORKING. SITE #00731301

13:30

WB SET WITH LEE'S TEMPORARY LOOPS, NEW MACHINE #80, AND NEW MAT. CORRECTION FACTOR IS 255 AND TEMPERATURE COEFFICIENT IS 8. SITE #00801305. WEIGHTS APPEAR HEAVY, LEE SAYS THAT 255 IS PROBABLY NOT THE CORRECT NUMBER. NEW CORRECTION FACTOR OF 245 ENTERED BY LEE. STILL LOOKS HIGH.

14:10

LEE NOW PLAYING WITH COMPUTER AND MACHINE #80 TO LOOK AT REAL-TIME DISPLAY FOR UPDATING CORRECTION FACTOR. EDUCATED GUESSING. NOW HAVE CF OF 200. LOOKS A LOT BETTER. ALSO SET UP NEW MARKSMAN 600- IT IS LOCKED UP, CANNOT ALTER PARAMETERS. LEE PULLED BATTERY AND SAYS IT IS LOW, 5.7 VOLTS. MACHINE WAS PICKED UP TO BE CHARGED IN SHOP.

LOOPS ARE 6X6 AND 16 FEET. HOSES FOR MARKSMAN 600 ARE 10 FEET APART. ALSO DISCOVERED THAT THE MAT IS NOT A NEW ONE AND LEE DOESN'T KNOW WHAT THE CORRECTION FACTOR OR TEMPERATURE COEFFICIENT IS. BOTH WERE GUESSES.

89/04/14

12:05

RETRIEVED EB TO FORENSIC.13E END DIRECTION

12:20

RETRIEVED WB TO FORENSIC.13W END DIRECTION. END SITE

FORENSIC.15 89/03/17 15:00
FORENSIC WEIGH IN MOTION SITE NUMBER 15 AT MP 239.5 E & WB ON I-10

89/03/15

10:00

EB SET ON 18' 6' x 6' SPEED LOOPS ON MACHINE 0381-0073 WITH MAT 033 CF 207 SITE NUMBER 00730015. THIS IS THE FIRST TIME THAT STATUS MODE 2 WORKS THE WAY WE THINK IT'S SUPPOSED TO. SHOWS 000 THAT GOES TO 111 WHEN A VEHICLE CROSSES.

11:00

WB SET ON 18' 6' x 6' TEMPORARY LOOPS ON MACHINE 0381-0074 WITH MAT RPM6 CF 132 SITE NUMBER 00740015. STATUS MODE 2 SHOWS 00-. IF WE HAD SOME HARD COPY TO MATCH THE SOFTWARE, WE MIGHT BE ABLE TO FIGURE OUT WHAT IS GOING ON NOW.

89/03/16

12:00

EB RETRIEVED TO FORENSIC.15B WITH JUST GOBS OF DATA. WB RETRIEVED TO FORENSIC.15A, GOOD LUCK WITH THE DATA... ONLY 280+ RECORDS. BACK TO WB, THE DATE WAS WRONG AND I KNOW IT WAS RIGHT --IT WAS DOUBLE CHECKED WHEN THE MACHINE WAS SET UP WITH RECORDING 3. 9 ERRORS SHOWING WITH ERRATIC READOUT IN STATUS MODE 2. 2 ERRORS IMMEDIATELY AFTER RETRIEVE, & IT DID NOT ZERO RECORDINGS. DID A RECORDINGS 3 AND IT DID ZERO AND ERRORS CLEARED. THEN WITHOUT GETTING ANY COUNTS FROM TRAFFIC IT SHOWED 1 ERROR 2 MINUTES AFTER LAST RECORDINGS 3 WAS ENTERED.

89/03/17

11:45

EB RETRIEVED TO FORENSIC.15D, LOOKS OK. WB RETRIEVED TO FORENSIC.15C, NO GOOD. END SITE

FORENSIC SITE 18

89/04/26

09:10

FORENSIC SITE 18 AT M.P. 360.0. EB SET WITH MACHINE #74 AND MAT 207 ON 16 FOOT LOOPS 6X6. PAVEMENT RUTTED BUT FAIRLY SMOOTH. SITE #00741801. TEXT BOOK OPERATION-STATUS MODE 2 SHOWS 1'S AND 0'S. LOOKS OK.

10:10

WB SET WITH MACHINE #73 AND RPM 6 WITH CF OF 132 ON 16 FOOT LOOPS 6X6. SITE #00731805. RAN OUT OF OUR REGULAR TAPE AND LOOP B IS MADE WITH DUCT TAPE-WE'LL SEE HOW THIS WORKS WITH THE PRIMER. RUNNING AT 10:35.

89/04/27

10:45

RETRIEVED EB AND ALL WAS WELL. 1300+ RECORDINGS, NO ERRORS. FILE IS CALLED FORENSIC.18E.

10:55

RETRIEVED WB AND OSCILLATOR CORD COVER WAS LOOSE AND FLOPPING AROUND. THE DUCT TAPE WORKS OK WITH PRIMER, BUT BY ITSELF IS NO GOOD. 1300+ RECORDINGS AND 2 ERRORS SHOWING. THE FILE IS CALLED FORENSIC.18W.

FORENSIC SITE 19

89/04/18

11:00

WIM STATION 19 SET AT K.P. 46.0 WITH MAT RPM6 CORRECTION FACTOR 132 AND DEFAULT TEMPERATURE COEFFICIENT OF 30. MACHINE #80 AND SITE #00801903. UP AND RUNNING AT 11:40.

12:40

NB SET WITH MAT 207 AND LEE'S MACHINE #14 WITH VERSION 10 FIRMWARE ON LOOP BOARD. SITE #00141907. UP AND RUNNING AT 12:50. BOTH SIDES SET ON TEMPORARY LOOPS 16 FEET AND 6X6.

89/04/19

13:00

RETRIEVED SB AND IT STILL LOOKED OK. IT HAD 578 RECORDINGS AND APPEARED TO BE DOING OK. NB SAME WAY. IT HAD 511 RECORDINGS. RETRIEVED FILES DUMPED ONTO DISK AS FORENSIC.19S FOR SOUTH BOUND AND FORENSIC.19N FOR NORTH BOUND.

FORENSIC SITE 20
89/05/03 BETWEEN GISS PARKWAY AND PORT OF ENTRY I-8

07:30

WB SET FIRST WITH MACHINE #74 AND MAT 207 ON 16 FOOT LOOPS 6X6. DIDN'T LOOK GOOD AT FIRST, STATUS MODE 2 SHOWED A DASH FOR THE MAT BUT IT WAS WORKING. RESTARTED AND MODE 2 CAME UP LIKE IT SHOULD. MAYBE MAT 207 IS BEGINNING TO FAIL? RUNNING OK AT 07:45. SITE #00742005.

09:00

EB SET WITH MACHINE #80 AND RPM 6 (C.F. 132) ON TEMPORARIES. NO ERRORS OR PROBLEMS. SITE #00802001. RUNNING AT THIS TIME.

89/05/04

08:15

WB UP AT THIS TIME. NO ERRORS WITH 500+ RECORDINGS. FILE DUMPED TO FORENSIC.20W. SITE 00742005.

09:00

EB PICKED UP AT THIS TIME WITH NO ERRORS. FILE DUMPED TO FORENSIC.20D.

FORENSIC SITE 22

89/05/01

10:30

EB SITE 22 SET ON I8 AT M.P. 105.0 WITH MACHINE #74 AND MAT RPM6 (C.F. 207) ON TEMPORARY LOOPS 16 FEET AND 6X6. ALL IS WELL AND WORKING CLEANLY AT 10:40. SITE #00742201.

10:45

WB SET WITH MACHINE #80 ON PERMANENT SPEED LOOPS, SQUARE, 18 FEET, 6X6. SITE #00802205. MAT #207. OPENED TO TRAFFIC AT 11:00 AND THIS ONE LOOKS OK TOO.

89/05/02

10:35

PICKED UP EB AND FOUND NO ERRORS AND STATUS MODE 2 SHOWED ALL 1'S. 500+ RECORDINGS. LOOKS OK. EB FILE CALLED FORENSIC.22E.

11:00

WB PICKED UP WITH 9 ERRORS SHOWING ON STATUS MODE 1, BUT IT APPEARS TO BE WORKING. 600+ RECORDINGS. FILE CALLED FORENSIC.22W.

FORENSIC.23 I-8 MP 134.5

NO REPORT.

FORENSIC.24 88/07/20 13:20
FORENSIC WIM ST-85 AT MP 149 N & S BOUND

88/07/19

NB SET ON MACHINE 349-0003 18' LOOPS SITE 85010003. SB SET ON MACHINE 381-0074 18' LOOPS SITE 85050074

88/07/20

13:15

RETRIEVED NB TO FILE FORENSIC.24A. RETRIEVED SB TO FILE FORENSIC.24B

FORENSIC SITE 25

89-02-15

09:30

SET EB US 60 AT M.P. 206.0 WITH WIM #073 AND MAT #207 AND WB US 60 AT M.P. 206.0 WITH WIM #074 AND MAT #132. BOTH MACHINES WORKED AT THE START -- NO PROBLEMS.

89-02-16

10:15

RETRIEVED BOTH MACHINES AND BOTH ARE STILL WORKING, BUT WB MACHINE #074 HAS 9 OR MORE ERRORS. SCANNING THE DATA FROM BOTH MACHINES IT APPEARS TO BE OK FOR EB, BUT WB LOOKS LIKE IT MAY HAVE BAD DATA.

FORENSIC.26 89/02/27 13:00
WEIGHING IN MOTION FORENSIC STUDY STATION 26 ON SR 87

89/02/27

10:30

NB SET AT MP 200.2 MACHINE 381-0073 MAT 033 CF 207 ON 6' x 6' 16' LEADING EDGE TO LEADING EDGE. MACHINE HAS 9 ERRORS AND RESET TIME DATE & CONFIG 9 HOURS AGO SET AT 10:30

11:15

SB SET AT MP 199.1 MACHINE 381-0074 MAT RPM6 CF 132 ON 6' x 6' 16' LEADING EDGE TO LEADING EDGE. TEST BOX SAYS LOOPS AND MAT OK. MACHINE HAS 5 ERRORS AND RESET DATE AND TIME CONFIG 10 HOURS AGO

89/02/28

10:45

NB MACHINE #73 (SITE NUMBER 00730026) APPEARED TO BE WORKING OK BUT SHOWED 9 ERRORS. SB MACHINE #74 (SITE NUMBER 00740026) ALSO APPEARED TO BE WORKING OK BUT SHOWED 00- ON THE DISPLAY (STATUS MODE 2) AND ALSO SHOWED 9 ERRORS. IT WOULD BE NICE TO KNOW WHAT STATUS MODE 2 IS FOR.

FORENSIC WIM STUDY #27 I-17 MP 233.4

88-11-29

11:15

SET UP 381-0014 WITH MAT 033/207 ON PERM SPEED LOOPS NB 18 FEET APART, SITE #0014-0027

88-11-30

11:15

ON-SITE INSPECTION REVEALED A PICKUP CLASSED AS A 5 AND A 3S2 CLASSED AS A 4. 900+ RECORDINGS MADE, AND IT WAS STILL WORKING. RETRIEVED OK.

12:00

SETTING UP SOUTHBOUND SITE (M.P. 223.65) SHOWED MULTIPLE ERRORS ON WEIGHMAN. INSTALLATION IS ONE PERMANENT LOOP AND ONE TEMPORARY LOOP 18 FEET APART. SITE NUMBER IS STILL 00140027.

12:15

BEGIN RECORDING.??? TEST PICKUP FIRST CLASSED AS A 6 THEN AS AN 8. OH WELL, STARTED WORKING ON THE THIRD TRY.

12:16

FIRST 3S2 CAUSES TEMPORARY LOSS OF COMMUNICATION.

89/05/24

10:30

SB STATION 27 SET THIS TIME ON TEMPORARY LOOPS 6X6 AND 16 FEET. LOCATION IS M.P.242.0 I-17. WEATHER IS CLEAR AND HOT. MACHINE #74 IS WITH MAT RPM9 AND A C.F. OF 132. SITE #00742705. RUNNING GOOD AT 11:00. LOOKS OK.

11:30

NB SET AT NEW RIVER ATR ON PERMANENT LOOPS. 18 FEET. 6X6. MACHINE #80 WITH MAT RPM6 AND CF OF 132. LOOKS OK. SITE #00802701. RUNNING AT 12:10.

FORENSIC.28 88/10/19 14:10:00
FORENSIC WIM SITE 28 AT MP 269.5 ON I-17 SB AND MP 273.0 NB

88/10/18

07:30

SETUP OF SB ON SLIGHT DOWNHILL WITH SHALLOW LEFT TURN. TRUCK WEIGHTS MAY BE HEAVY DUE TO TRUCK SHIFT OVER MAT. ALL 3 MACHINES TRIED ON MAT RPM9/132 WITH ONE COUNT LOOP AND ONE TEMP LOOP 5'x 6'THREE TURNS 18' LEADING EDGE TO LEADING EDGE. NO COMMUNICATIONS FROM ANY MACHINE.

13:00

MALFUNCTIONING LOOP CONNECTOR CAUSED PROBLEM? SITE NUMBER 00140028. ALL PREVIOUS REMAINS. MISSING SOME VEHICLES, MAT ACTING UP NOW AND AGAIN.

14:05

SETUP OF NB. 6'x 6' FOUR TURN TEMP LOOPS 18' LEADING EDGE TO LEADING EDGE. MAT 033/207 USED WITH SITE NUMBER OF 00740028. MISSING SOME VEHICLES. SLIGHT UPHILL.

88/10/19

08:15

RETRIEVED NB INTO FILE FORENSIC.28A. RE-NAILED MAT DOWNSTREAM.

08:35

RETRIEVED SB INTO FILE FORENSIC.28B

13:05

RETRIEVED SB INTO FILE FORENSIC.28C. END SB. MAT IS LOOSE AGAIN. DROPPING SOME VEHICLES.???

14:10

RETRIEVED NB INTO FILE FORENSIC.28D. END SB. STATUS MODE 2 SHOWS ACTIVITY ON BOTH LOOPS AND MAT, BUT NO COUNT OR RECORDING IS MADE. MAYBE WHY SO LOW IN RECORDINGS.???

14:50

AFTER SCANNING DATA.... NEITHER DIRECTION IS RELIABLE. BOTH ARE ONLY A SAMPLE OF TRUE TRAFFIC. IT'S TWO MONTHS
SINCE LEE HOCKERT RECEIVED OUR COMMENTS AND REQUESTS.....NOTHING IN RESPONSE. ENGLAND STATED THREE MONTHS BACK THAT "WE HAVE A
FIX FOR YOUR SOFTWARE PROBLEM."....NOTHING FROM THEM EITHER SINCE.

WHEN LEE WAS HERE HE TOLD US TO SEND BACK ONE OF THE WIMS FOR REPAIR. WHAT'S THE POINT? ALL THE MACHINES ACT THE SAME WAY:

1)LOSS OF COMMUNICATION WHILE CONNECTED TO THE RETRIEVER. MOVING CURSOR CAUSES LOSS??

2)IN LEES' WORDS "IT WORKS GREAT, IT JUST MISSES SMALL VEHICLES." NOT TRUE, THEY ALL MISS ALL CLASSES OF VEHICLES EVEN THOUGH STATUS MODE 2 SAYS IT SHOULDN'T.

3)RESETTING OCCURS ON A RANDOM BASIS FOR ALL MACHINES. THE DEFAULTS OF CONFIG 44 AND ALL PARAMETERS PLUS THE LOSS OF ANYTHING IN MEMORY HAS HAPPENED TO ALL MACHINES.

wim29.doc 88/08/24 16:00:00
FIELD NOTES FOR FORENSIC WIM STATION 29

88/08/22

13:05

SET MAT AT SPEED LOOPS LOCATED AT MP335.00 I-17 SOUTH OF FLAGSTAFF. 349-005 SET AND NOT WORKING, LOOPS & MAT INACTIVE. REPLACED WITH 3081-0014 SET ON MAT 207 WITH CORRECTION FACTOR 207 18 FOOT LOOP SEPARATION 6 FOOT LOOPS. CONFIGURATION 47 CLASS 5 & ABOVE.

14:30

CHECKED SPEED LOOPS LOCATED AT MP299.30 I-17 SOUTH OF FLAGSTAFF. ONLY COUNT LOOPS. FOUND TWO LOCATIONS FOR SB SITE 337.00 CONCRETE, FLAT, NEED 2 TEMPORARY LOOPS 338.60 ASPHALT, UP-HILL, NEED 1 TEMPORARY LOOP

15:00

CHECKED NB SITE IT'S STILL WORKING!!!

88/08/23

07:15

349-0005 TRIED AND FAILED!!! SET 349-0003 AT 337.00 SB I-17 SOUTH OF FLAGSTAFF. CORRECTION FACTOR OF 132 ON MAT 157 LOOP SEPARATION OF 18'6X6' LOOPS.

10:30

TIRED OF WAITING FOR JIM WATSON. WILL PROVIDE OUR OWN TRAFFIC CONTROL. FILE NAMED WIM29.001 IS NORTHBOUND MACHINE #14 FIRST RETRIEVE. WE WILL NOW COUNT TRAFFIC AT FLAGSTAFF ATR.

13:30

BEEN RAINING FOR COUPLE HOURS NOW, WE DID RETRIEVE. SOUTHBOUND MACHINE WAS WORKING UNTIL WE ARRIVED. THE B LOOP HAD COME UP FROM WATER, THE TAPE WASN'T HOLDING. ON STATUS MODE 2 B LOOP WAS INACTIVE. PULLED THE DEAD LOOP OFF THE ROAD AND PICKED UP THE MACHINE BUT LEFT THE MAT. MAYBE IT WILL DRY OUT. HAH! THE SOUTHBOUND FILE IS CALLED WIM29.002. NORTHBOUND IS STILL CHUNKING AWAY AND THE FILE IS CALLED WIM29.003.

88/08/24

07:00

SB STILL WET. CANNOT PUT NEW TEMPORARY LOOP DOWN AT THIS TIME.

07:30

NB RETRIEVED, CALLED IT WIM29.004, STATION PICKED UP.

10:15

INSTALLED NEW SB LOOP WITH ADHESIVE PRIMER PAINTED ON ROAD AND STUCK DOWN WHITE REFLECTORIZED TAPE PAINTED BLACK. PRIMER WAS USED AROUND MAT ALSO TO SEE WHAT HAPPENS TO DUCT TAPE ON MAT IN RAIN. MACHINE HAD 2 ERRORS IN IT,STATUS MODE 1. COUNT WAS RESET TO 0. ERRORS WERE CLEARED, RECORDINGS 3,0.

12:40

CHECKED SB STATION. WORKING FINE. METALIZED STRIPING TAPE SPLITTING ALONG LOOP LINES. CAN SEE RED WIRE SHOWING.

16:00

CHECKED AND RETRIEVED, IN THE RAIN. WORKING GOOD. LOOP TAPE NEEDS TO BE HEAVIER QUALITY. ALL WIRES EXPOSED ALTHOUGH NOT MOVING AROUND. FILE WIM29.005.

08/25/88

06:20

RETRIEVED SOUTHBOUND MACHINE BUT IT ONLY HAD 300 SOME RECORDINGS. INDUCTANCE AND RESISTANCE LOOKED OK BUT INSULATION RESISTANCE WAS ABOUT 2 MOHMS.

08:30

PULLED STATION. SCANNING DATA SHOWED THAT IT WORKED, SORT OF, UNTIL 5A. DENIS DECIDED THAT IF THE TOTAL WAS NOT ENOUGH THEN IT CAN BE RESET.

09:00

REPLACED B LOOP. MAYBE WE CAN ACCUMULATE ENOUGH DATA TO FULFILL THE 24 HOUR REQUIREMENT. LOOKS OK.

13:00

MACHINE LOOKS OK. IT'S NOT RAINING YET BUT PROBABLY WILL. NO RETRIEVE AT THIS TIME BECAUSE ONLY ONE HUNDRED OR SO RECORDINGS. WILL TRY THIS AFTERNOON.

16:00

RETRIEVED SOUTHBOUND AND DUMPED INTO FILE CALLED WIM29.007. LOOKS OK AND NOT TOO LIKELY TO RAIN, BUT WOULDN'T BET ON IT.

88-08-26

08:00

NO RAIN LAST NIGHT SO WE DON'T KNOW IF THE LOOP WOULD HAVE STAYED DOWN OR NOT. THE MACHINE WORKED OK AND HAD SOME FIVE HUNDRED RECORDINGS. ALSO NOTE; WE STARTED THE RETRIEVE AND THEN UNPLUGGED THE MAT AND LOOPS-THIS APPARENTLY IS NOT SUPPOSED TO BE DONE BECAUSE EITHER THE RETRIEVER OR THE WEIGHMAN LOCKED-UP AND AFTER ABOUT 7 MINUTES HAD TO PUSH CANCEL AND START OVER. LUCKILY WE DIDN'T LOSE THE DATA. THEN THERE APPEARED ONE ERROR IN STATUS MODE 1. SCANNING THE DATA SHOWS AN ABUNDANCE OF SLOWER TRUCKS, WE FIGURE IT'S BECAUSE THIS LOCATION IS SLIGHTLY UP-HILL AND NOT TOO FAR FROM THE I-40 T.I. WE ALSO NEED NEW UNDER PADS. THIS MORNING THE PAD HAD MIGRATED FROM UNDER THE MAT ON THE DOWNSTREAM SIDE. IT WAS STILL WET UNDERNEATH ALSO. HOPEFULLY THIS IS THE LAST TIME WE HAVE TO SET I-17 SOUTH OF FLAG.

FORENSIC.030 88/09/15 15:00:00
FORENSIC WIM STUDY SITE 30 NORTH OF FLAGSTAFF ON US-89 AT MP 434.23

88/09/13

14:30

NB SET ON SPEED LOOPS 18' LEADING EDGE TO LEADING EDGE. MACHINE 0381-0014 MAT 157 OSC 4 SLIGHT DOWN HILL AT END OF LONG DOWN HILL FROM SADDLE. SITE #00143001 SINGLE LANE

15:30

SB SET ON TEMP LOOPS 18' LEADING EDGE TO LEADING EDGE. MACHINE 0349-0003 MAT 207 OSC 1 SLIGHT UPHILL AT BOTTOM OF LONG UPHILL TO SADDLE. SITE # 00033002 LOOPS PUT DOWN WITH PRIMER & SCOTCH RUBBER TAPE. TWO LANES SET IN SLOW LANE.

88/09/14

07:00

NB RETRIEVED TO FORENSIC.30A. SB NO COMMUNICATION. BATTERY IS 5.6 VOLTS ON VOM. NO RETRIEVE. NO MORE BATTERIES, WAITING FOR TEMPERATURE/VOLTAGE TO COME UP AND SEE WHAT HAPPENED.

08:00

SB RETRIEVED TO FORENSIC.30B WITH DIFFICULTY. BATTERY READOUT IS 5.3 VOLTS. VOM SHOWS BATTERIES AT 5.6V. MACHINE IS 23:30 RESET TO CURRENT TIME & DATE. FAILED. RESET RECORDINGS, "0", BECAUSE STATUS MODE 2 HAD "---" DISPLAY. LOST COMMUNICATIONS. RETRIEVER HAS UNCHANGED TIME DATE & RECORDINGS, "116". RESET FAILED.

08:30

SB RESET FAILED. BATTERIES SHOW 5.62V ON VOM.

09:00

SB RESET FAILED. BATTERIES SHOW 5.64V ON VOM.

09:30

NB CHECKED... 56 VEHICLES. SB RESET FAILED. BATTERIES SHOW 5.67V ON VOM.

10:00

SB RESET FAILED. BATTERIES SHOW 5.68V ON VOM.

10:30

SB RESET FAILED. BATTERIES SHOW 5.69V ON VOM.

11:00

SB RESET FAILED. I QUIT WITH THIS MACHINE.

14:30

NB RETRIEVED TO FORENSIC.30C END NB. SB SETUP WITH 0381-0014 ON MAT 157 SITE #00143002 ALL ELSE SAME. START SB AT 14:40

88/09/15

07:00

BELOW FREEZING AGAIN LAST NIGHT. SB RETRIEVED TO FORENSIC.30D WORKING FINE. LOOPS ARE LOOKING GOOD.

11:00

SB CHECKED OK.

15:00

SB RETRIEVED TO FORENSIC.30E END SB. BOTH LOOPS ON SB STAYED DOWN NICELY. END SITE